

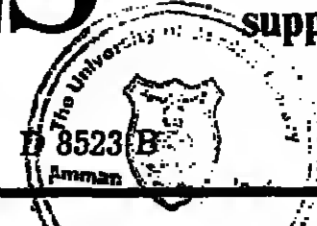
FINANCIAL TIMES

EUROPE'S BUSINESS NEWSPAPER

No. 29,080

Monday May 23 1983

Wall Street's delayed reaction to money supply rise, Page 20



Algeria	100	11.100	Algeria	100	11.100
Argentina	100	11.100	Argentina	100	11.100
Australia	100	11.100	Australia	100	11.100
Belgium	100	11.100	Belgium	100	11.100
Canada	100	11.100	Canada	100	11.100
Denmark	100	11.100	Denmark	100	11.100
France	100	11.100	France	100	11.100
Germany	100	11.100	Germany	100	11.100
Greece	100	11.100	Greece	100	11.100
India	100	11.100	India	100	11.100
Indonesia	100	11.100	Indonesia	100	11.100
Italy	100	11.100	Italy	100	11.100
Japan	100	11.100	Japan	100	11.100
South Korea	100	11.100	South Korea	100	11.100
Spain	100	11.100	Spain	100	11.100
Sweden	100	11.100	Sweden	100	11.100
Switzerland	100	11.100	Switzerland	100	11.100
Taiwan	100	11.100	Taiwan	100	11.100
Thailand	100	11.100	Thailand	100	11.100
UK	100	11.100	UK	100	11.100
USA	100	11.100	USA	100	11.100

NEWS SUMMARY

GENERAL BUSINESS

Many die in new Lebanon troubles

At least 23 people were feared dead after a wave of abductions by rival Druze and Christian communities in the Shebshat Mountains outside the Lebanese capital, Beirut.

More than 100 people from both sects were kidnapped at roadblocks. In Beirut, Lebanese Premier Shafiq al-Wazzan called on Syria to withdraw its troops from the country to test the reliability of Israel's pledge to withdraw. Report: Anatoli seeks support, Page 2

In Israel, police held two suspects in connection with the murder three months ago of peace demonstrator Emil Grunzweig.

Doctors on strike

Seven thousand Israeli Government-employed doctors walked out of hospitals and clinics while the Cabinet met to discuss their pay.

500 bombs thrown

About 500 petrol bombs were thrown at police in Bogside, Londonderry, early yesterday. It was the worst attack on police in that part of troubled Northern Ireland for several years.

Apartheid blamed

Apartheid Dennis Hurley, chairman of South Africa's Roman Catholic bishops' conference, said the Government's apartheid policies were largely to blame for the Friday bombing in Pretoria in which 17 people were killed. ANC warning, Page 2

Air show crash

A Canadian Starfighter exploded in the air at a U.S. military air show outside Frankfurt, and wreckage killed three adults and two children in a parked car. The pilot ejected safely.

War deaths charge

Albert Navas, 74, a Canadian since 1958, was flown from Toronto to West Germany to face charges of ordering the deaths of 11,584 Lithuanian Jews as a Nazi secret police officer in World War II.

Turks' freedom swim

Six Turkish nationals, four of them Kurds, sought political freedom in Greece after swimming across the River Evros in Thrace.

Soviet music ban

Soviet cultural authorities have banned the first performance, in Moscow, of an oratorio, The History of Dr Faust, by leading Soviet modernist composer Alfred Shnitke. It is due to be performed in Vienna next month.

Malawi deaths

Political struggles linked with the succession to President Dr Hastings Banda are believed to lie behind the death of two senior Ministers in Malawi. Page 2

Avalanche kills four

An avalanche hit the Italian town Teglio near the Swiss border, killing four people and injuring 19. Seven people were reported missing.

House to emigrate

Work starts today on dismantling a Southampton, England, house and shipping it to Bundaberg, Queensland, where Australian flying ace Bert Hinkler, who lived in it when working as a test pilot, plans to re-erect it.

Briefly...

Alain Prost (France, Renault) won the Belgian Grand Prix at Francorchamps.

Palermo: Police have arrested 32 Mafia suspects in connection with a nationwide meat racket.

Rome: Former Italian international Giorgio Chinaglia has offered to buy Lazio soccer club for \$7m.

Brazil split over \$84bn debts

BRAZIL'S leading business federations are divided over how best to tackle repayment of its \$84bn external debts. Page 2. Leading article, Page 18

CIVIL AVIATION: Further efforts will be made at talks opening in London today to improve Anglo-U.S. relations. Price fixing and the Laker Airways' conspiracy case are likely prominent issues. Page 20

THYSEN chief executive Dr Dieter Spethmann attacked successive West German governments for failing to protect the country's steel industry against subsidised European competition. Page 20

CURRENCIES showed little change within the European Monetary System last week. The D-Mark remained the weakest currency.

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The third factor in Mr Reagan's decision would be whether there is

someone else who could do the job as well or better, the Treasury Secretary said.

Mr Reagan refused to speculate on alternative candidates, but Mr Alan Greenspan, the well known economic consultant and a former chairman of the Council of Economic Advisers, would be the most likely, on the basis of his past experience, to qualify on the last score.

Asked about current monetary policy, Mr Reagan also said he was "not alarmed" by the recent upsurge in U.S. monetary growth, although he was "concerned" about the Fed's inability to keep money supply on a steady course. Nevertheless, interest rates "could easily come down a point or two" further this year with the appropriate monetary policy and with action from Congress in budget deficits, he claimed.

The Administration will try to emphasise the budget deficits from 1985 onwards, Mr Reagan and other senior officials made clear over the weekend. This followed last week's

vote by the Senate in favour of a budget which was unacceptable to the President because of its tax increases, military spending cuts and high rate of non-defence spending.

The confrontation with Congress will make it all the more important for President Reagan to persuade the nation that he is just as determined as the legislators to reduce budget deficits - but in his own way, according to White House strategists.

In order to prevent Congress, and particularly the Democrats, from setting the deficits as "their issue," the President will remind the nation that he proposed large tax increases from 1985 onwards in his original budget, presented to Congress in February.

The crucial differences between the President and Congress, Mr Reagan noted yesterday, were that the President would not allow tax increases this year to stifle an economic recovery and that he would not raise taxes simply to finance higher government spending.

Officially, removal of economic sanctions against Poland still depends on three conditions: lifting of martial law, release of political prisoners, and a "dialogue" between the Government, the Solidarity trade union and the Church. But some senior officials have claimed to detect a slight easing in the President's approach, and have argued in the past few days that the resumption of grain talks with the Soviet Union is a symptom of this.

"I think it is clear to everyone now that Poland is better off now than it was two years ago or even a year ago," Mr Howard Baker, the Senate majority leader said after a briefing on Soviet trade held at the White House last week.

Other informed sources, however, argue that the President's stance to Poland is still as unyielding as ever, and point out that the National Security Council and the Defence Department may have a very different view of the matter from the "eyes" in the State Department. All agree that the Pope's forthcoming visit to Poland may be crucial in determining the future approach of the U.S.

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Regan increases speculation over Volcker's future

BY ANATOLE KALETSKY IN WASHINGTON

Mr Donald Regan, the U.S. Treasury Secretary, added fresh fuel yesterday to the speculation that Mr Paul Volcker might not be reappointed as chairman of the Federal Reserve Board when his current term of office expires in August.

Mr Regan said in a television interview that, although President Ronald Reagan had not yet addressed the issue, his decision would be based on three aspects of Mr Volcker's record as Fed Chairman. None of these three aspects appears to stand in Mr Volcker's favour, although Mr Regan did not say that.

The first consideration would be the Fed's general performance under Mr Volcker. This had not accorded with the President's desires until about nine months ago, Mr Regan conceded.

A second main factor would be the President's personal feeling of "ease in his relationship with Paul Volcker."

According to most White House and Fed sources, Mr Volcker has never had a particularly satisfactory personal relationship with President Reagan. In fact, they have only met face to face on a handful of occasions in the past two years.

The third factor in Mr Reagan's decision would be whether there is

someone else who could do the job as well or better, the Treasury Secretary said.

Mr Reagan refused to speculate on alternative candidates, but Mr Alan Greenspan, the well known economic consultant and a former chairman of the Council of Economic Advisers, would be the most likely, on the basis of his past experience, to qualify on the last score.

Asked about current monetary policy, Mr Reagan also said he was "not alarmed" by the recent upsurge in U.S. monetary growth, although he was "concerned" about the Fed's inability to keep money supply on a steady course. Nevertheless, interest rates "could easily come down a point or two" further this year with the appropriate monetary policy and with action from Congress in budget deficits, he claimed.

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vote by the Senate in favour of a budget which was unacceptable to the President because of its tax increases, military spending cuts and high rate of non-defence spending.

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The crucial differences between the President and Congress, Mr Reagan noted yesterday, were that the President would not allow tax increases this year to stifle an economic recovery and that he would not raise taxes simply to finance higher government spending.

Officially, removal of economic sanctions against Poland still depends on three conditions: lifting of martial law, release of political prisoners, and a "dialogue" between the Government, the Solidarity trade union and the Church. But some senior officials have claimed to detect a slight easing in the President's approach, and have argued in the past few days that the resumption of grain talks with the Soviet Union is a symptom of this.

"I think it is clear to everyone now that Poland is better off now than it was two years ago or even a year ago," Mr Howard Baker, the Senate majority leader said after a briefing on Soviet trade held at the White House last week.

Other informed sources, however, argue that the President's stance to Poland is still as unyielding as ever, and point out that the National Security Council and the Defence Department may have a very different view of the matter from the "eyes" in the State Department. All agree that the Pope's forthcoming visit to Poland may be crucial in determining the future approach of the U.S.

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U.S. in talks on Polish sanctions

By Our Washington Staff

THE REAGAN Administration has been holding exploratory discussions with its European allies on the possibility of easing economic sanctions against Poland.

Some Administration officials say further relaxations could follow President Ronald Reagan's decision last week to resume talks with the Soviet Union on a long-term grain sales agreement.

In recent discussions with European officials, Mr Richard Burt, the U.S. Assistant Secretary of State for European Affairs, is said to have revived the idea that sanctions could be dismantled on a step-by-step basis in response to any signs that the Polish regime is moving towards less repressive domestic policies.

The European allies have argued from the beginning of the Polish crisis in 1980 that the West's response should be based on a "carrot and stick" approach, using positive incentives, as well as punitive measures, to put pressure on the Polish and Soviet Governments.

President Reagan has been adamant in his public pronouncements since the lifting of martial law in Poland last December that this did not constitute a substantive improvement in the Polish situation.

Officially, removal of economic sanctions against Poland still depends on three conditions: lifting of martial law, release of political prisoners, and a "dialogue" between the Government, the Solidarity trade union and the Church. But some senior officials have claimed to detect a slight easing in the President's approach, and have argued in the past few days that the resumption of grain talks with the Soviet Union is a symptom of this.

"I think it is clear to everyone now that Poland is better off now than it was two years ago or even a year ago," Mr Howard Baker, the Senate majority leader said after a briefing on Soviet trade held at the White House last week.

Other informed sources, however, argue that the President's stance to Poland is still as unyielding as ever, and point out that the National Security Council and the Defence Department may have a very different view of the matter from the "eyes" in the State Department. All agree that the Pope's forthcoming visit to Poland may be crucial in determining the future approach of the U.S.

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OVERSEAS NEWS

Spanish minister under fire

MADRID - A speech in Brazil by King Juan Carlos of Spain has prompted a call for the resignation of Sr Fernando Moran, the Spanish Foreign Minister.

The speech, made by the king in Brasilia last week during his tour of Latin America, repeated part of an article by Sr Felipe Gonzalez, the Prime Minister, which appeared in the French publication Le Monde Diplomatique.

Two Spanish newspapers, El Pais and Diario 16, yesterday devoted editorials to the address, the latter calling on Sr Moran to resign.

The Foreign Ministry plays a key role in the writing of the king's speeches on official trips, Diario 16 said.

"How can people who listen to the speeches of King Juan Carlos believe in their sincerity if they then discover the words were expressed earlier by someone else with a clearly defined ideology?" the newspaper asked.

"It is a serious business which should lead to the resignation of the man responsible, who is none other than the ill-fated Foreign Affairs Minister."

In the repeated paragraphs, King Juan Carlos heralded the start of a new era of relations between Spain and South America and said the task of maintaining and developing existing links would be one of the cornerstones of Spanish foreign policy.

"The Latin American dimension is one of the fundamental objectives of the foreign policy of my country," he said.

No explanation of the repetition of Sr Gonzalez's comment was available from the Foreign Ministry.

Reuter

Crackdown feared in Argentina

BY JIMMY BURNS IN BUENOS AIRES

LEADING Argentine politicians at the weekend publicly aired fears of a military crackdown amid a growing controversy over human rights in the country.

The military junta on Friday night issued a lengthy document alleging that members of the leading opposition party, the Peronists, along with human rights activists were organising a fresh outbreak of terrorist violence.

Warning that "May is an important month for the terrorists' plans," the junta also said it had uncovered plans to assassinate several trade union leaders and Sr Angel Robledo, a leader of the moderate faction of the Peronist Party.

The document was a major departure from the cautious public profile favoured by President Reynaldo Bignone, and was reminiscent of the language used to justify the repression of political activity following the military takeover in 1976.

It drew a sceptical response from several political leaders. Sr Antonio Cafiero, a former Peronist economy minister, claimed that sectors of the armed forces were looking for an excuse to provoke a coup.

The junta's warning was issued against a background of the country's biggest ever human rights demonstration to protest at last month's official document on the

"disappeared." Led by Sr Adolfo Perez Esquivel, a Nobel Peace prize winner, and leaders of the country's eight human rights organisations, some 50,000 people marched through central Buenos Aires before staging a mass rally outside the building of the Congress.

Argentina has been without its parliament since a state of siege was imposed before the 1976 coup.

Sr Esquivel, who was publicly supported by all the major political groupings, drew loud applause in a speech demanding justice for those guilty of human rights violations.

In what was officially described as the last word on the issue of the "disappeared," the junta last month

said that thousands of Argentines who had gone missing following the 1976 coup were now dead.

The military's tough stance drew renewed international protest at the weekend. Speaking in Genoa, President Sandro Pertini of Italy accused Argentina's generals of having committed "barbarous crimes" in their fight against terrorism. Sig Pertini said Italy had been plagued by left and right-wing terrorism for the last decade but had not resorted to breaking the law.

Relations between Argentina and Italy have been further strained following the alleged murder by security forces of Sr Osvaldo Cambiaso, a joint Argentine-Italian national.

Brazil's business groups in dispute over debt

BY ANDREW WHITLEY IN RIO DE JANEIRO

BRAZIL'S LEADING business federations are locked in a growing dispute over the need for a moratorium on payments or a further renegotiation of the country's \$84bn (£55bn) external debt.

Over the weekend, Sr Ruy Barreto, president of the Confederation of Commercial Associations of Brazil, came out in favour of a temporary suspension of debt payments to allow the Government to put its cash flow back into equilibrium.

Sr Barreto was supporting a similar call made at the end of last week by the National Confederation of Industry.

Powerful opposition to this view has come from the Sao Paulo State Federation of Industries, FIESP, whose president said a moratorium was out

of the question. The immediate consequences, he warned, would be the suspension of oil supplies from abroad and the total collapse of the domestic economy.

In New York last Friday, Sr Erasmo Galves, the Brazilian Finance Minister, said reports circulating among Western bankers that Brazil would be forced soon to declare a full scale moratorium were "baseless." He also described suggestions of a new maxi-devaluation of the cruzeiro as an "unmentionable idiosyncrasy."

In a fresh effort to demonstrate that it is keeping its house in order, Brazil is expected this week to announce further cuts in state company budgets and sharp increases in domestic

Electronic cash link for seven Nordic banks

BY ALAN CAME IN LONDON

THE NORDIC banks, involving seven major banking institutions across three continents, are co-operating to provide electronic corporate cash management services for their customers.

It is thought to be the first time so many big banks have linked to provide an electronic banking service involving the transmission of information about their customers' accounts.

A corporate customer in New York will be able to use a television-like screen in his office to examine the state of his accounts in one or all of the banks in the Nordic group.

They include Copenhagen Handelsbank, the Nordic American Banking Corporation of New York and the Nordfinanz-Bank of Zurich.

The "NordicCash" system has been installed by the UK arm of National Data Corporation (NDC), the U.S. computer services company, which has already installed corporate cash management systems for the National Westminster Bank in London and Dresdner Bank in West Germany.

In the U.S., NDC has installed corporate cash management systems for Manufacturers Hanover and Bank of America among others.

Companies using NordicCash will be able to monitor their currency positions not only for domestic accounts but for accounts abroad. In the future the system will allow payments from accounts abroad through the same terminals.

Mystery of Malawi deaths

By Our Johannesburg Correspondent

POLITICAL STRUGGLES over Malawi's Presidential succession are believed to lie behind the mysterious deaths of two of the country's most powerful ministers, reported in circumstances suggesting domestic confusion.

Mr Dick Matenje, secretary-general to the ruling Congress Party and Minister without Portfolio, and Mr Aaron Gadamu, Minister for the Central Region, are said to have been found dead,

supposedly in a car accident on the Malawi-Mozambique border, after Malawi radio had broadcast a reward for their discovery.

Reports reaching Johannesburg add that two or three other ministers may have either disappeared or been kidnapped.

There has been speculation about a failed coup, though Blantyre and the capital Lilongwe are reported to be outwardly calm.

Parliament was adjourned last week after the Life President, Dr Hastings Kamuzu Banda, announced that elections would be held next month; the date was later adjusted to June 23.

Dr Banda is in his 60s and the succession, although a taboo subject, inevitably looms large.

Mozambique reshuffle President Samora Machel of Mozambique has announced a reshuffle of several key ministers involved in security and the beginning of a Government overhaul to decentralise the bureaucracy, and give a higher priority to agriculture, writes Quentin Peel, Africa Editor.

Upper Volta arrests Two Upper Volta ministers and a trade union leader have been arrested and accused of fomenting anti-government demonstrations, the ruling People's Salvation Council (CSP) said yesterday, Reuter reports from Ouagadougou.

Italian poll pledge Guido Carli, governor of the Bank of Italy for 15 years and one of Italy's most respected financial figures, said yesterday he would stand for parliament in next month's general election as a Christian Democrat, Reuter reports from Rome.

Sudan accuses Libya A senior Sudanese official says Libya is helping mercenaries under its command to occupy a Chadian town with the aim of overthrowing the government of Hissene Habre, according to the Sudan News Agency, Reuter reports from Khartoum.

Cyprus anger The Cyprus Government yesterday accused Mr Rauf Denktaş, the Turkish Cypriot leader, of trying to torpedo efforts to reach a solution to the island's dispute, Reuter reports from Nicosia.

Lebanon's Prime Minister, meanwhile called on Syria yesterday to withdraw from Lebanon and test the reliability of Israel's pledge to pull out its own troops.

If for whatever reason there is no Israeli withdrawal, the

Pretoria bomb is just the beginning, ANC leader warns

BY MICHAEL HOLMAN IN NAIROBI AND J. D. F. JONES IN JOHANNESBURG

MR OLIVER TAMBO, leader of the African National Congress (ANC), warned over the weekend that South Africa should expect repetitions of the Pretoria bombing as part of the intensification of his organisation's campaign against white minority rule.

Mr Tambo said he could not claim responsibility for the attack in which 17 people died and 217 were injured, until he received reports from within South Africa.

"As soon as we are absolutely sure we will make a statement to that effect," he said on Saturday.

In South Africa, whites are in a trauma of shock and rage as they absorb the implications of the country's worst terrorist assault.

It is now realised that the toll might have been much higher as hundreds of military personnel would normally gather in the street to await transport only minutes after the bomb exploded. The assumption is that the bomb had been prepared for them and might have gone off prematurely, with the result that most of the casualties were civilians.

Mr Tambo declared: "The policy of the ANC (which is banned in South Africa) is to intensify the struggle, attack the enemy, avoiding civilians where possible."

In the past, he said, the ANC had concentrated on sabotage of installations such as railways and buildings. "But intensification involves not just sabotage, but attacking the enemy forces."

South African military raids on ANC offices near Maputo, Mozambique, in 1981, and in Maseru, Lesotho, last December, in which civilians died, had prompted this change of strategy.

When asked whether the Pretoria bombing was an example of what might be expected, he replied: "Absolutely."

Mr Tambo was also asked if Western investment would be excluded from attack. He replied: "No. Foreign firms have become militarised. Foreign capital is now part of South Africa's military might."

The first ANC reaction to Friday's blast came earlier on Saturday in a statement issued from its office in Lusaka, Zambia, which spoke of "an escalating armed struggle." The attack had been directed at a military installation, and casualties were mainly air force and military intelligence personnel, it said. But the statement did not specifically claim responsibility.

The ANC may be reluctant to make such a claim from anywhere in Africa which might be within reach of South African retaliation.

Few people in South Africa doubt that the defence and security authorities will be determined to strike back at the ANC in as dramatic and forceful a manner as possible.

Arafat seeks support against Fatah rebels

BEIRUT - Mr Yassir Arafat, head of the Palestine Liberation Organisation, yesterday continued his efforts to contain a dissident movement among guerrilla fighters by visiting Palestinian fighters in two refugee camps on the outskirts of Tripoli in Lebanon.

Mr Arafat has made almost daily trips to PLO positions in Lebanon's eastern Bekaa valley over the last week to drum up support against a peaceful rebellion by dissident officers in his Fatah guerrilla group there.

Fatah moved to contain the rebellion on Saturday by ordering five leading dissidents to be put under Mr Arafat's direct command and naming other PLO fighters from contacting them. A statement from the group's central committee also pledged to prepare for a Fatah congress—an apparent concession to the dissidents who demanded such a meeting to air their complaints about Mr Arafat's leadership.

Mr Chafiq al-Wazzan, Lebanon's Prime Minister, meanwhile called on Syria yesterday to withdraw from Lebanon and test the reliability of Israel's pledge to pull out its own troops.

If for whatever reason there is no Israeli withdrawal, the

Egypt has turned down a U.S. offer to pay for development of the Ras Mamas military base on the Red Sea coast, and is to pay for the work itself. The decision overcomes the problem of control of the base, which had raised the issue of sovereignty, writes Charles Richards in Cairo.

The late President Anwar Sadat originally offered the facilities to the U.S., but refused to allow a permanent base there.

Failure to resolve legal and procedural difficulties has now led the Egyptians to assume the task of doing the work themselves, even though this might take longer because of cash problems.

effect on the general conditions in Lebanon and the region as a whole will be of the utmost gravity," he told a Lebanese magazine, Monday Morning.

Mr Philip Habib, President Ronald Reagan's special envoy, yesterday flew to Beirut after meeting Mr Yitzhak Shamir, the Israeli Foreign Minister, in Jerusalem. According to Israeli Radio, he said he remained optimistic that Syria would agree to a withdrawal of foreign forces from Lebanon.

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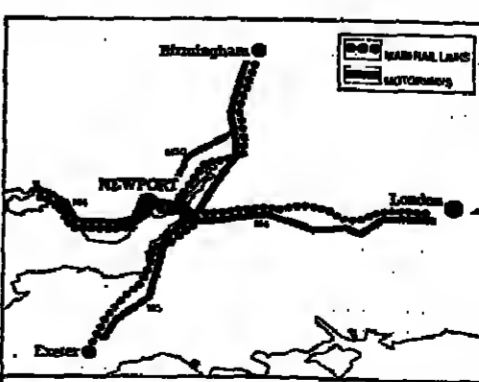
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European truck exports 'to fall 30%'

By Kenneth Gooding,
Motor Industry Correspondent

TRUCK exports from Europe will fall nearly 30 per cent this year, dragging down production by 10 per cent, according to the latest forecast from the London-based DRI Europe group.

As a result manufacturers will concentrate more on European markets, so there will be no let-up in the intense competition even though there should be some recovery in demand.

DRI says the slump stems from the steep fall in purchases by members of the Organisation of Petroleum Exporting Countries (Opec) which in recent years have taken about 40 per cent of trucks exported from Europe. It points out that the situation will have a greater adverse impact on the stronger manufacturers than their smaller rivals.

The smaller manufacturers, concentrating mainly on the European market, have already slimmed to meet the recession. It is their major competitors who now feel the pinch and are in consequence raising the pressure on the European market, the report says.

The fall in export demand from beyond Europe will continue through 1984, DRI maintains. However, output in the five main EEC production countries should recover next year following three successive years of decline.

Output in the five countries (France, Italy, the Netherlands, West Germany and the UK) was 1.44m commercial vehicles of all types in 1982. It fell to 1.2m in the following year, to 1.17m in 1982 and is forecast to fall to 1.14m this year. DRI expects the total to be up slightly at 1.19m in 1984.

Production in West Germany is predicted to fall from 386,000 last year to 342,000 in 1983 before recovering to 370,000 next year. For France the comparative figures are 369,000, 334,000 and 358,000; for the UK 225,000, 237,000 and 234,000; for Italy 149,000, 163,000 and 167,000; and for the Netherlands 11,000, 11,300 and 12,600.

Summing up, DRI says: "A modest, broadly-based recovery will begin in 1984."

"DRI European Trucks Forecast Report," 140 pages. Price \$1,400 or £800 from DRI, 30, Old Queen Street, London SW1H 9HP.

Richard Johns looks at the Trans-Sahara gas pipeline proposal

U.S. interest may not be enough

NOTHING could have been more predictable than the welcome given by Mr Donald Model, the U.S. Secretary of Energy, to the Spanish proposal for a pipeline linking Nigeria with North Africa and, ultimately, West Europe.

Tension between the U.S. and its European allies over the deal under which the Soviet Union would supply up to 40bn cubic metres of gas via the Siberian pipeline by the end of the decade may have eased with the lifting of Washington's sanctions against the project. But the Administration's hostility and concern over its Allies' dependence on Russian gas remains and the prospect of an alternative must look promising.

Nigeria is one of the more obvious sources of supply to meet the growing requirements of West Europe in the 1990s when indigenous output will be declining. It is, moreover, desperately anxious to get a return on its gas, which is now going to waste.

Nigeria is ranked 12th outside the Communist bloc in terms of proven gas reserves, a quarter of which are associated with oil output. About 90 per cent of current gas production is being flared.

The Spanish proposal, put forward at an International Energy Agency meeting in Paris earlier this month, is for a pipeline running from Spain to Algeria through Morocco, crossing the Mediterranean at the Straits of Gibraltar. A branch line would then run from Algeria to Nigeria.

INITIAL REACTION among senior Algerian officials to the pipeline proposal is very cautious. Francis Gilles, reports from Algiers, Algerian officials say they are interested in the idea, but that many difficulties remain.

The Algerians point to the weak demand for energy in Europe, especially for natural gas. Spain last year only took 1.5bn cubic metres of the 4.5bn cubic metres of gas it had contracted to buy from Algeria and Italy will not be buying the full 12.5bn cubic metres a year which it has agreed to buy from Algeria before 1988.

Meanwhile the 20 per cent premium over market prices which the French have been paying for their Algerian gas

will fall to 4 per cent on July 1 when the price of the gas declines to \$3.95 per million British Thermal Units. Spain is currently paying only \$3.40 per mBtu.

Algeria's fourth European customer, Distrigas of Belgium, is also negotiating a volume cut in the amount of gas it had contracted to buy.

The recent summit between King Hassan of Morocco and President Chadli of Algeria has led to a lessening of tension in North West Africa, but Algerian officials do not believe that the crisis between the two countries over the future of the Western Sahara will be easily or quickly solved. Either of the two routes proposed for the pipeline therefore carries a risk, for the security of the line.

The much shorter Straits of Gibraltar route, of 17 miles at a maximum depth of 900 feet, looks like a much better proposition, especially on grounds of cost. Linking an Algerian-Spanish line to one from Nigeria also makes sense not only for Spain and France but also for Algeria.

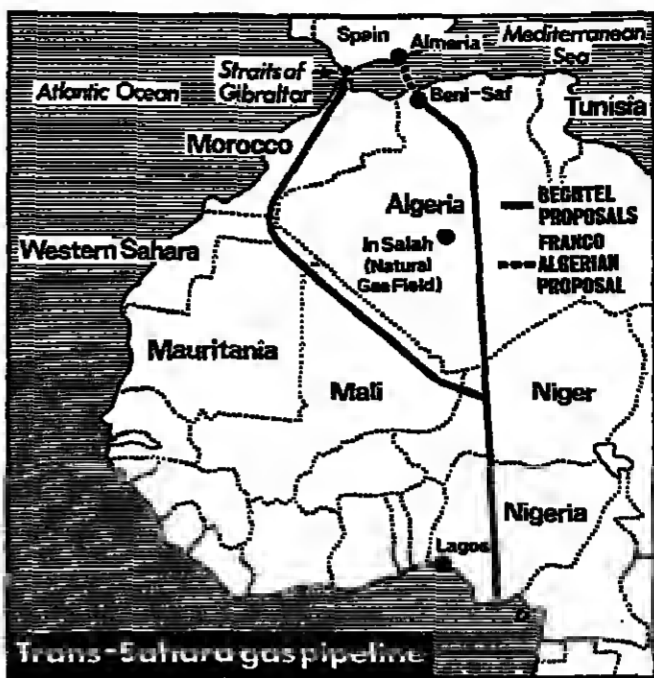
The construction of a trans-Saharan facility would also enhance the possibilities of developing the gas resources of the In Salah region of central Algeria.

The idea of a trans-Saharan pipeline was discussed in 1972 by the Algerian Government and ENI of Italy. In November, 1981 the same Bechtel, with an obvious interest in its implementation did an in-house analysis, concluding that such a pipeline appeared sufficiently viable to warrant further study.

According to Bechtel, a 52-inch facility powered by a 46 compressor stations and with a design capacity of 1.5bn cubic feet per day could be constructed at a cost of between \$8.5bn and \$9.8bn.

The lowest estimate related to the most direct route across the centre of Algeria and the highest to the one going via Morocco to the Straits of Gibraltar. It was reckoned that a project could yield a discounted cash flow of 19 per cent on the basis of a well-head price of \$1.50 per 1,000 cubic feet plus transit fees through the various countries.

Nigeria has not yet expressed a view about the project. For several years, Lagos has been interested in a liquefied



Natural Gas project under which 1.5bn cubic metres per day, 30 per cent of it associated with production from the Bonny oil field and 70 per cent unassociated, would have been processed for export.

In 1981, when the estimated cost of this project had climbed to between \$10bn and \$14bn, purchasing commitments had not been obtained and Nigeria itself was running out of money. Phillips Petroleum and British Petroleum pulled out of the project. It was no coincidence that Bechtel did its analysis of the pipeline concept at this stage.

Nigeria is now going ahead with another LNG project half as large as the cancelled one. Technical and financial feasibility studies done by Arthur

D. Little and First Boston are understood to be positive and Lagos clearly sets a high priority on going ahead with a scheme that is more advanced than the pipeline idea. Purchasing commitments and financing have still to be arranged, however.

Transporting gas to Western Europe via a trans-Saharan pipeline might prove to be a more economically viable method and also a more secure one if it is assumed that the countries traversed have a vested interest in safe-guarding the facility.

At the same time, however, it remains to be seen whether the Algerian-Moroccan rapprochement, promising though it may be, has yet gone far enough for the project to be considered a serious possibility.

Chinese delegation arrives for oil talks

By Colina MacDougall

THE FIRST delegation to Britain from China's leading Special Economic Zone, Shenzhen, arrives in London today for two weeks of talks with government officials and companies.

Special Economic Zones offer foreign businessmen lower tax rates and special facilities for investment which do not apply elsewhere in China. Shenzhen, one of four so far established, adjoins Hongkong and has attracted substantial investment.

The highlight of the mission's trip will be a briefing with offshore oil companies in England's north-east. Within Shenzhen, a special oil base is planned at Shekou on the west coast, to service the South China Sea offshore oil industry.

About 20 British companies are expected to attend the briefing at Shekou on Tuesday. These will include companies with experience in rig building and equipment and in supply boats. China's offshore industry is expected to start shortly, following the award of the first exploration contract to BP in early May.

The delegation, led by the vice mayor of Shenzhen, Mr Zhen Ding, was invited by the National Economic Development Council and is sponsored by the Foreign Office. It will go first to the north east,

World Economic Indicators

INDUSTRIAL PRODUCTION (1975 = 100)					
	Mar. '83	Feb. '83	Jan. '83	Mar. '82	% change over previous year
U.S.*	139.7	137.4	137.4	141.7	-1.4
France	113.4	103.8	103.4	111.0	+2.3
UK	122.0	117.4	118.0	128.8	+1.0
West Germany	112.5	105.0	106.1	119.0	-5.0
Italy	125.8	116.1	115.0	136.7	-8.0
Netherlands	113.0	104.0	114.0	114.0	-0.5
Japan	94.7	91.1	103.3	94.4	-1.7

* 1987 = 100.

Source (except U.S., Japan): Eurostat

SHIPPING REPORT

Improvement in crude cargo rates from Gulf

BY OUR SHIPPING CORRESPONDENT

INDICATIONS are that there has been a steady increase of crude shipments from the Gulf for both Eastern and Western destinations and that shipping rates have generally tended to improve, reports shipbrokers E. A. Gibson.

Gibson pointed out, however, that much of the ex-Gulf business has been done on a very private basis with the details of transactions impossible to confirm.

Galbraith Wrightson reports that transatlantic rates for coal, grain and ore cargoes remained relatively steady during the week with weaker tendencies in grain shipments from the U.S. to the Continent. Galbraiths cautioned that no clear overall market mood was discernable because Gulf-to-Continent grain shipments had been fixed at lower rates, while Gulf-to-Japan grain shipments had been paid for at higher rates. Coal and ore rates were steady.

Videotex deal for UK company

BY RAYMOND SNODDY

A UK computer services company has won a contract to build and manage a videotex communications link between London and Stockholm for the Swedish Post Office.

From September, visitors to Swedish post offices will be able to call up pages of the latest financial and business information from London on the screens of Postel, the Swedish Post Office's videotex service.

The two-year contract, worth £500,000, has been won by InterCom Videotex (ICV), a subsidiary of Inter Commu-

ties, the independent London commodity brokers.

Mr David Taylor, managing director of ICV, says the contract is essentially to manage a data base for the new Swedish service which will be called Postel International.

The Postel International database will be available throughout Sweden, Norway, Finland and Denmark, using the Nordic telecommunications network. Postel computers will have a 24-hour on-line connection with ICV.

The Swedish contract is ICV's

first major international deal but the UK company already provides financial information for videotex users in the UK, West Germany, the U.S. and the Netherlands. ICV manages Prestel's CitiService for British Telecom. The information provided for CitiService will be available to Postel but ICV hopes that a local database will be built up.

This could include travel timetables and booking systems, electronic banking and local financial information on the Stockholm stock and foreign exchange markets.

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Armo Trust Ltd.	10%	Knowles & Co. Ltd.	10%
Associates Cap. Corp.	10%	Lloyds Bank	10%
Banco de Bilbao	10%	Lloyds Bank	10%
Bank Hapoalim BM	10%	Mallinham Limited	10%
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WORLD TRADE NEWS

Clouds gather over Chile airline

Europe flights halt may be only the start, writes Mary Helen Spooner

CHILE'S national airline, Lan Chile, is undergoing an extensive study by government authorities to determine its future, after two years of losses totalling more than US\$75m, and with this year's losses expected to be about \$45m.

Lan attributes its problems to the general slump in the industry and to Chile's economic problems involving the devaluation of the peso. For the three years to mid-1982 the currency was fixed at 30 pesos to the dollar, but it has since fallen to 73.6 pesos.

The airline's fleet, meanwhile, is being reduced. Last year Lan sold one of its three Boeing 707s. It plans to sell the other two this year. This will leave the airline with four aircraft - two wide-bodied DC-10s used for the Santiago-Lima-Miami-New York routes, and two Boeing 737s used for shorter international flights and domestic flights. The

DC-10s are leased from Air New Zealand.

The airline recently suspended its flights to Europe, which went from Santiago to Rio de Janeiro, Madrid, Paris and Frankfurt. Lan has insisted that the suspensions were temporary, but it has closed its offices in Paris and Frankfurt. These closures triggered a strike in the Paris office.

The president of the Lan-Chile Workers' Union in Santiago, Sr Alfredo Villa, said the airline had committed itself to handing out US\$2m in severance pay to the 200 or so employees laid off by the cuts.

Adding to Lan-Chile's headaches is a suit filed by the widow of Orlando Letelier, the Chilean Ambassador to the U.S., who was assassinated

in a car bombing in September 1976 in Washington D.C. U.S. officials have asked for the extradition of three Chilean security officials indicted in the case, but Chile has refused. Earlier this year a U.S. federal judge in New York banned Lan-Chile from taking any of its holdings out of the U.S. until the Chilean Government paid \$2.8m in damages.

The ruling ended in legal confusion, however. Since the planes Lan-Chile uses for its Miami-New York flights are leased from New Zealand, the move had no apparent effect other than unfavourable publicity. The Lan-Chile flights between Santiago and the U.S. have continued without interruption.

The airline's problems have a

touch of irony, given Lan-Chile's recent history and accomplishments. According to Sr Gustavo Götter, the public relations director, the company changed itself from being a heavily subsidised and inefficient enterprise in the early 1970s to a profitable airline by 1980.

Lan-Chile won safety prizes in 1979, 1980 and 1981, and the International Air Transport Authority (IATA) has given Lan-Chile a 93 per cent punctuality rating. IATA has also ranked Lan-Chile among the top 15 airlines in the world in respect of productivity per employee on an airline mileage count.

Part of the problem with Lan-Chile's former European flights, Sr Götter said, was the disadvantage it faced in competition with European airlines.

Lan-Chile hopes to resume its European flights by 1985.

Timken order set to go after 33 years

By William Hall in New York

THE U.S. Justice Department has tentatively agreed to lift a 33-year-old court order which prevents the British and French operations of Timken, one of the world's biggest producers of tapered roller bearings, from fixing prices or dividing up the world market.

The Ohio-based group is the biggest producer of roller bearings in the U.S. and the court order dates back to a civil antitrust suit which charged that Timken had conspired with British Timken and Société Anonyme Française Timken to divide up the world market for anti-friction bearings. These are the company's main product and used widely in the world car and truck industries.

At the time the order was filed Timken owned only 30 per cent of the UK company and 50 per cent of the French company. Since then it has acquired full control of both, and in the late 1950s they became divisions of the parent company.

Mr William French Smith, the U.S. Attorney General, said on Friday that the Government's tentative agreement was contained in a stipulation filed in the U.S. district court in Cleveland. The public have 60 days to comment on the proposal.

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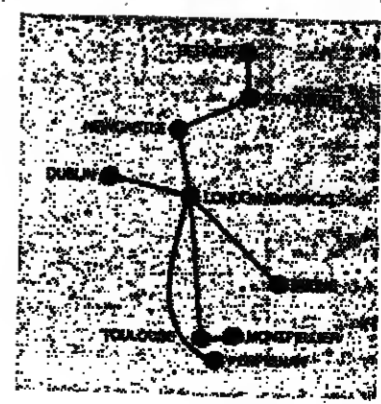
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For more details of Dan-Air services by BAe 146, call your nearest Dan-Air office or 01-680 1011.



BRITISH AEROSPACE



STATISTICAL TRENDS: EMPLOYMENT

The grim spectre of unemployment

THE HIGH rate of growth forecast for the world labour force over the next 20 years carries a grim implication of rising unemployment. Even the industrialised countries, with lower population growth in prospect, seem certain to experience high levels of unemployment. With higher population growth, the developing countries face even greater difficulties.

In the OECD economies the main change in employment structure over the past two decades has been the rise of the services sector. This has gone hand in hand with the growth of governments' share in employment. On average, over the whole OECD, the governments' share grew by 55.4 per cent over the period 1960-80. This figure hides wide differences between member countries with Sweden showing an increase of almost 21 times, while in the U.S. the government's share barely grew.

Participation rates are continuing to rise in most major industrialised economies. The major exception is the UK which recorded falls in each of the past two years. The

Commentary by Our Economics Staff: data analysed by Financial Times Statistics Unit; charts and graphs by Financial Times Charts Department

relatively low figure for Italy may be partly explained by its large proportion of unrecorded employment.

The relative dominance of large-scale industry is reflected in the figures for employment status. Countries with the highest proportion of self-employed tend to be those with relatively large percentages employed in agriculture, forestry and fishing.

The speed with which unemployment has grown in major industrialised countries is a product not only of a decline in the number of jobs but also of sharply increasing labour forces as the 1980s "baby boom" comes of age. This latter trend will

continue through the 1980s becoming, perhaps, the dominant influence on employment levels.

The rate with which unemployment benefit replaces previous disposable income varies considerably. The "typical worker" is defined as a male production worker in manufacturing industry, married to a non-working wife with two children.

This definition is actually untypical in a statistical sense. In 1980 it accounted for only 15 per cent of total unemployment in Finland and 10 per cent in the UK. The "average unemployed" definition takes into account the high levels of youth and female unemployment, and where it is possible to calculate disposable income replacement rates on this basis, very different results occur.

Working hours are subject to the various influences of both long and short-term labour supply and demand trends. In the short term fluctuations in product demand are increasingly reflected in working hours, through overtime, shift work, etc. However, most industrialised countries have experienced a relatively strong decrease in annual working hours averaging out at about -0.7 per cent over the past two decades.

Since 1970 part-time jobs have increased between two and four times as rapidly as total employment. The OECD estimates that between 80 per cent and 85 per cent of these were filled by women (in 1977, 20.25 per cent of all women in the labour force worked part-time). Most of these jobs were created between 1970-73 (except in the U.S.); and in the following years the share of part-time jobs levelled off. More recently a new increase seems to have occurred. The proportion of jobs which are part-time varies between OECD countries from less than 10 per cent (Finland, Ireland, Italy) to over 40 per cent (Denmark, Norway, Sweden, UK) and is usually related to the labour force participation of women.

WORLD LABOUR FORCE

	Average Annual Growth (%)			Structure 1980 (%)		
	1960-70	1970-80	1980-2000	Agricult.	Indust.	Services
Low Income Economies	1.4	2.2	1.9	71	14	15
Middle Income Economies	2.0	2.3	2.6	44	22	34
Industrial market Economies	1.2	1.3	0.7	6	38	56
Non-market industrial Economies	0.7	1.2	0.6	16	45	39

Source: World Bank

General



EMPLOYMENT STATUS 1980

	Employees	Self employed	Unpaid family workers
U.S.	90.6	8.7	0.7
Japan	63.2	13.7	22.9
W. Germany	86.2	9.6	4.3
France	82.9	17.1	—
Italy	73.0	15.9	11.1
Canada	90.1	8.7	1.1
UK	96.2	3.8	—
Ireland	74.3	22.2	3.5

Source: OECD



GROWTH RATES OF PUBLIC AND PRIVATE SECTOR EMPLOYMENT

	1960-65		1965-70		1970-73		1973-78	
	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.	Pub.	Priv.
U.S.	2.9	1.5	3.9	1.9	1.0	3.5	1.3	2.2
Japan	na	na	na	na	2.7	3.2	3.1	-0.2
W. Ger.	4.6	0.1	2.5	-0.5	5.0	-0.6	3.1	0.3
France	-0.5	0.7	2.2	0.7	1.8	-0.4	1.8	-1.4
UK	-0.1	1.0	2.5	-0.9	3.1	-0.3	1.7	-0.5
Sweden	4.5	0.2	6.9	-0.5	3.6	0.6	1.7	-2.0
Austria	2.0	-0.4	2.5	-1.2	2.4	0.5	2.9	-0.7

Source: OECD

PARTICIPATION RATE*

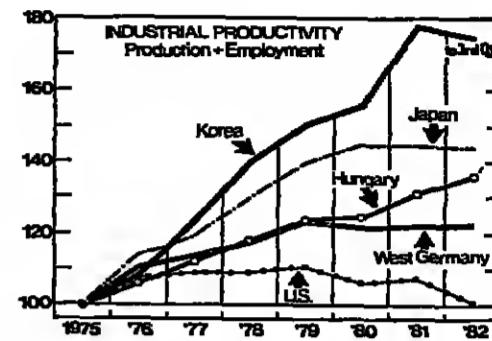
	%			
	1979	1980	1981	1982
U.S.	46.7	47.0	47.3	47.5
W. Germany	43.0	42.8	43.5	43.6
Japan	48.3	48.4	48.5	48.5
France	42.0	42.1	42.5	na
Italy	38.6	39.0	39.4	39.5
UK	47.0	47.1	46.8	46.4
Sweden	51.4	51.9	52.0	52.3

* Civilian labour force as a proportion of population. Sources: OECD, Eurostat

UNEMPLOYMENT BENEFIT: RATE OF DISPOSABLE INCOME REPLACEMENT*

	1972	1974	1976	1978	1980
"Typical worker"					
W. Germany	70.0	70.4	73.3	71.5	69.0
France	84.7	89.0	90.6	91.4	93.8
Italy	42.6	41.4	43.6	46.4	46.7
Denmark	82.5	88.2	89.7	90.1	95.0
Finland	58.2	57.9	57.7	54.5	45.4
UK	na	62.4	64.3	58.9	48.2
U.S.	58.9	60.1	59.9	60.7	61.4
"Average unemployed"					
Finland	na	76.1	76.0	69.3	56.0
Ireland	na	51.5	52.5	51.7	42.1
UK	na	na	na	na	na

* Unemployment benefits as a per cent of former disposable income. Source: U.N.



Hours and Earnings

INDUSTRIAL STOPPAGES

Working days lost per 1,000 employees, all industries and services

	Annual average		
	1972-76	1977-81	1981
U.S.	446	409	370
W. Germany	17	29	3
Japan	170	28	14
UK	491	571	197
France	236	145	86
Italy	1,485	950	588
Canada	1,113	776	899
Netherlands	4	30	6

Source: Dept. of Employment

ACTUAL HOURS WORKED PER PERSON IN EMPLOYMENT

% annual growth

	1970-73	1973-76	1976-78	1978-80
U.S.	-0.04	-0.90	-0.15	-0.65
Japan	-0.35	-0.70	0.32	-0.43
W. Germany	-1.41	-0.75	-1.50	-0.84
France	-0.29	-1.12	-1.06	-1.53
UK	-1.02	-1.74	-1.27	-0.24
Netherlands	-2.23	-0.58	0.11	-0.89
Belgium	-1.53	-1.42	-1.08	-2.92
Canada	-0.33	-1.24	-0.59	-2.33

Source: OECD

WEEKLY HOURS WORKED PER EMPLOYEE 1979

Industry Services

	Industry	Services
W. Germany	41.0	41.7
France	41.7	41.7
Italy	40.5	38.8
UK	41.5	40.6
Netherlands	39.7	38.9
Belgium	40.1	39.1
Denmark	38.1	39.6

Source: Eurostat

EARNINGS AND LABOUR COSTS IN MANUFACTURING

Hourly averages for production workers (\$ U.S.)

	1975		1982*	
	Earnings	Lab cost	Earnings	Lab cost
U.S.	4.83	6.35	8.50	11.73
W. Germany	3.97	6.19	6.01	10.38
Japan	2.66	3.05	4.98	5.80
France	2.71	4.58	4.37	7.96
Italy	2.33	4.40	4.03	7.44
UK	2.44	3.27	4.95	6.73
Korea	0.31	0.37	1.06	1.25
Brazil	0.90	1.13	2.08	2.60
Mexico	1.44	1.92	1.97	2.73

* Provisional, † Includes employers' contributions. Source: U.S. Dept. of Labor

Women

FEMALE SHARE OF EMPLOYMENT AND UNEMPLOYMENT 1982

% Employment Unemployment

	% Employment	% Unemployment
U.S.	43.5	42.1
Japan	39.0	38.2
W. Germany	38.4*	44.3
France	38.3*	57.1
Italy	32.5	55.6
UK	41.1	35.5

* 1981. Source: OECD

Youth

YOUTH UNEMPLOYMENT

March 1983

	% of labour force of same age	% of total unemployed
W. Germany	14.9	23.4
France	24.5	39.5
Italy	34.2	47.4
Netherlands	35.0	38.2
UK	27.6	37.6
Denmark	33.9	29.0
Belgium	32.6	36.0
EEC (10)	26.4	34.8

Source: Eurostat

LABOUR FORCE EMPLOYMENT & UNEMPLOYMENT

Net change 1970-81



Motor Industry

EMPLOYMENT IN MOTOR VEHICLE INDUSTRY

Annual % change

	1977	1978	1979	1980	1981	1982
W. Germany	5.5	3.6	2.7	1.8	-1.8	0.1
France	0.8	0.7	-1.4	-3.6	-7.6	-2.9*
Italy	0	1.3	4.6	0.7	-4.2	-4.9*
UK	5.7	0.4	-2.6	-10.8	-17.1	-11.8*
Belgium	1.4	1.3	3.8	-0.5	-9.6	-3.7*
EEC (9)	3.3	1.7	0.7	-2.6	-7.1	-3.7

* First three quarters. Source: Eurostat

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UK NEWS

Forecasts fail to beat the market

By Jeremy Stone

FOREIGN exchange forecasting services in the UK do not seem to be very successful in helping their customers to "beat the market." In most cases, according to a study in the City University's new *Economic Review* investors would do better - sometimes much better - if they were to follow a passive policy of buying and selling in the forward market on the principle that the forward price ought to be the best predictor of future spot prices.

The international working party on exchange market intervention - set up after the Versailles summit - recently found that "readily accessible information on inflation and interest rate differentials" gives a better predictor of spot rates than do forward rates. So it looks as if there could be something badly amiss in the British forecasting services studied by the City University Business School.

The six major forecasts studied were almost uniformly bad at predicting correctly whether the currency would go up or down, and also at getting on the right side of the market (so that the forecast and the eventual spot rate are both more, or both less, than the forward rate). Flipping a coin would tend to pick the right direction of change half the time, but over a three-month horizon only one forecaster managed a 50 per cent record in even a single currency (the Yen) out of the five being forecast. The overall performance of the forecasts was discouraging.

For a forecast to be used profitably in opening forward positions it has to be on the "right side" of the forward rate. But results here were also disappointing, with today's spot rate being the best predictor of the spot rate a year hence for every currency except the Italian lira.

On the other hand, the margin of error in the forecasts was sometimes respectably small. Even though the worst of them was likely to be 10 times as far from the target as the three-month forward rate (for sterling-dollar rates), the best were able to beat the forward rate over a twelve-month horizon. However, the researchers point out that this is chiefly due to a deterioration in the forecasting accuracy of the forward rate.

Short-term recovery predicted in engineering

BY ALAN PIKE

MECHANICAL engineering output is forecast to increase by 7 per cent from the middle of this year to the end of 1984.

But the latest mechanical engineering short-term trends, published today, stress that "the forecast increase in output during the next 18 months will no more than make up for the reduction in output which has occurred in the last 18 months."

Under the forecasts contained in the trends, output volume in the final quarter of next year would be at the same level as in the first quarter of 1983. The forecast level of output volume for 1984 is about 18 per cent below the 1979 level.

Mechanical engineering output trends have been almost continually downward since the beginning of

1978. While the forecast now suggests a period in which the trend will be upward, the short-term trends working party warns that "this short-term recovery does not necessarily imply that the longer term downward trend has been halted."

The working party - consisting of employer, trade union and Government representatives - bases its assumptions for mechanical engineering on the view that UK manufacturing as a whole will increase by about 3 per cent between 1982 and 1984, compared with a reduction of 15 per cent between 1979 and 1982.

So far as individual sectors are concerned, the working party expects substantial growth in output in instrument and electrical engineering, and possibly printing and publishing and chemicals. By contrast, it expects output to "decline substantially in shipbuilding and marine engineering and less severely in the metal manufacture and textile, leather and clothing sectors."

The working party expects the recent low level of export volume to pick up and possibly lead to an increase in the volume of export shipments between 1983 and 1984. It has modified previous pessimistic statements about export potential to the oil-producing countries, and now believes that their demand for UK mechanical engineering products will not decline as seriously as was feared.

Mechanical Engineering Short Term Trends, subscription only, Engineering Employers' Federation, London.

Aurora financial reconstruction plan to be redrawn

BY RAY MAUGHAN

PLANS which had reached an advanced stage for the £20m financial reconstruction of Aurora, the Sheffield-based engineering, castings and forgings group, will be redrawn this week following a substantial undershoot of the aid envisaged from the public sector.

Details of a reconstruction package were expected to be announced this week, but it is now understood that the Department of Industry has committed only the minimum aid required under the Industries Act 1971.

The private sector participants, which are believed to include the National Coal Board Staff Superannuation Scheme and Finance For Industry among half a dozen leading institutions, had hoped that the department would extend, or "stretch" the provisions of the Act and commit about £2m to the scheme. Instead, the Government has decided to provide only £250,000 in grants and special aid.

This decision was described last week as a "psychological blow" to the private sector in relation to joint City and public sector re-financing proposals for industrial companies. It contrasts sharply with the formation last year of Sheffield Forgemasters from the special steel divisions of both the British Steel Corporation and Johnson Firth Brown.

On that occasion, it was evident that the public sector was quite prepared to lead the way while the contribution from City of London institutions was much delayed and only committed towards the end of the negotiations in piecemeal sums.

Aurora has a severe balance sheet deficiency. Under the terms of the Companies Act, 1980, it was required to seek shareholders approval for a substantial increase in its borrowing limits in anticipation of the equity and grant transfusion from the consortium of City and Department of Industry interests.

CSI and banks to meet on disclosure rules

BY CHARLES BATCHELOR

THE Council for the Securities Industry (CSI), the City's main self-regulatory body, and representatives of the merchant banks will try again on Wednesday to agree rules for the disclosure of substantial holdings by the banks in companies.

The two sides disagree over how the banks should treat shares, held in discretionary accounts for clients, which add up to 15 per cent or more of a company's equity.

The banks believe that unless the owners of the various holdings are clearly acting as a "concert party" to gain control of a company, they should not be required to disclose their holdings.

The Association of Investment Trust Companies, one of whose members claimed a large holding of this kind was being used to exert pressure on it, has called for a stricter interpretation of the rules on acquisitions of shares.

Unemployment 'could halve' says new economic study

BY JEREMY STONE

BEFORE the end of the 1980s the rate of unemployment in the UK is likely to be halved whoever wins the general election next month, according to Professor Michael Beenstock and his colleagues at the City University Business School.

They say this will happen because a spontaneous recovery in employment and output is in prospect, as real wage growth moderates in response to slackness in the labour market.

This view is embodied in a new model of the UK economy, which concentrates more than most previ-

ous models on the "supply side" of the economy, assuming that in the long run the level of output depends more on what producers find it profitable to produce than on the amount of output demanded.

Thus, the recession since 1979 is held to be mostly the result of influences depressing the supply side, when rapid increases in the cost of labour, energy and capital, and a rising exchange rate kept profitability at very low levels, reducing the private sector's desire to produce. By comparison with these forces, says the Beenstock team, the de-

mand side effects of tight money since 1979 "look ordinary."

For this reason, Keynesian policies for expanding demand are regarded as inappropriate means for bringing about prolonged recovery; demand was not deficient.

The model is intended to give projections over a long period, and various scenarios are set out, running until 1995.

The *Economic Review*, City University Business School, Frohiser Crescent, Barbican, London.

Savings receipts still down

By Jeremy Stone

TOTAL net receipts from National Savings in April were an estimated £179.2m, including accrued interest. This is £30.6m higher than in March, but falls well short of the average monthly inflow in the last financial year of £246m.

The main net contributions to funding came from fixed-interest National Savings Certificates (£114m), National Savings Income Bonds (£60m) and National Savings Bank investment accounts (£25m). Premium Bonds made a net contribution of £10 and the NSB ordinary account (£7m).



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A FINANCIAL TIMES SURVEY

GOLD

JUNE 23

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1. Introduction The Gold market prospects for Gold price movements in the year ahead, etc.
2. Gold in the World Monetary System
3. Futures markets
4. London bullion brokers
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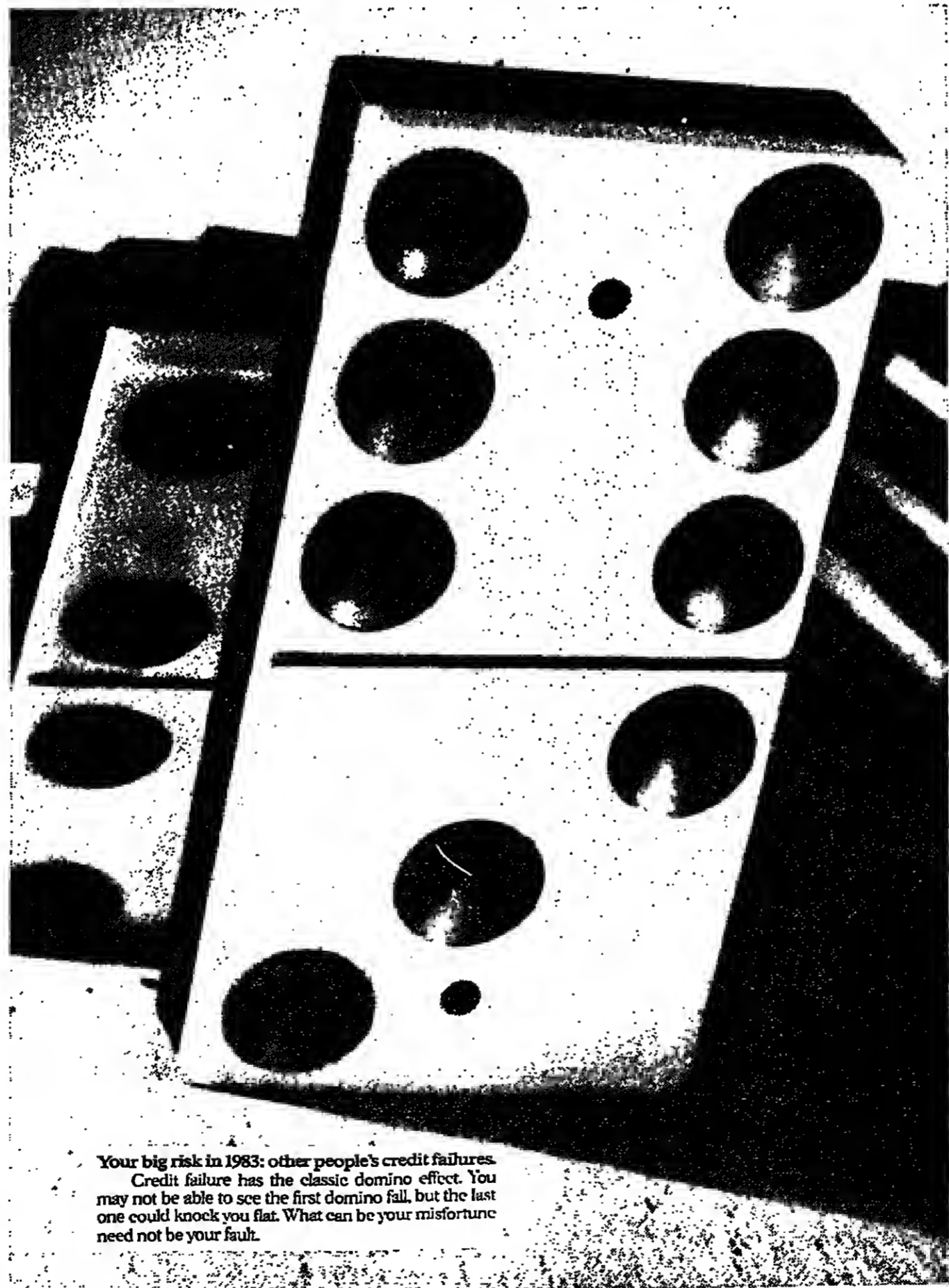
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Final dividends for the year ended 31st December 1982

Scrip Dividends

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	HKS
A shares	12.37
B shares	2.05

In a letter to shareholders from the Chairman dated 6th May 1983, it was announced that the recommended final dividends for 1982 of 52.0c per A share and 10.4c per B share will take the form of scrip dividends to be satisfied by the issue of additional A shares and additional B shares respectively, but that shareholders will be able to elect to receive dividends in cash in respect of all or part of their shareholdings. It was further announced that entitlements to fractional shares will be disregarded and the benefit thereof will accrue to the Company.

Applying the average last dealt prices noted above, the number of new shares which shareholders will receive in respect of their existing shares for which elections to receive cash are not deposited by 27th May 1983, either with the Registrars in Hong Kong, or with the Registrars' Agents in the United Kingdom, will be calculated as follows:

For A shares:	Number of new A shares to be received	=	Number of existing A shares	x	0.520
					12.37
For B shares:	Number of new B shares to be received	=	Number of existing B shares	x	0.104
					2.050

and will be rounded down to the nearest whole number of new shares, fractional entitlements being disregarded.

Subject to the approval of the recommended final dividends by the shareholders at the annual general meeting of the Company to be held on 27th May 1983, certificates for the new A shares and B shares in respect of the scrip dividends, which will rank pari passu with the existing issued shares of the Company, and the dividend warrants in connection with the cash dividends, will be despatched to shareholders on 10th June 1983.

By Order of the Board
JOHN SWIRE & SONS (H.K.) LIMITED
Secretaries

Hong Kong,
23rd May, 1983

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UK NEWS

Tebbit spells out more employment changes

BY JOHN LLOYD, LABOUR EDITOR

MR NORMAN TEBBIT, the Employment Secretary, has spelled out a further series of sweeping changes in employment law to take effect if the Conservatives win the general election.

Mr Tebbit enlarged on the indications given in the Conservative manifesto, published last week and stressed his belief that in the event of a Tory victory, the trade unions would "do some fundamental rethinking" on their present attitude of non-cooperation.

He repeated his willingness, first stated last December, to "move over" if it was "thought after an election that for the unions to come to a rapprochement, they should talk to someone other than me." He mentioned Trade and Industry and the Home Office as preferred choices of department - but said that he would enjoy carrying forward the considerable legislative programme planned for employment.

This will include:

- The need to hold strike ballots - not necessarily postal ballots but "fair and free" - before any union calls a strike, whether local or national.

If there were no ballot unions would lose immunities granted under section 29 of the 1974 Trade Unions and Labour Relations Act, and their funds would be at risk.

● A "specifying" of some industries and services as "essential" and the requirement in these services to stick to procedure agreements on pain of loss of immunities. Mr Tebbit said that the number of essential services or industries would probably be "narrowly drawn" - but could include the public and private

sectors. A green paper discussion document will be issued before legislation.

● Legislation to ensure that union members have "effective choice" on payment of the political levy - though Mr Tebbit said that "if the unions are willing to talk on how to put these abuses right there may be no need to legislate."

He said that "the simple and clean-cut solution would be to return to 'contracting in' to the political levy (presently a member must 'contract out' of payment) but we have listened to what the Labour Party and the unions have said and we wouldn't want to wreck a politi-

cal party lightly." Earlier possibilities of bringing in state aid for parties now seem remote.

● The existence of a political fund will require periodic endorsement - probably once every ten years - by union membership in a ballot.

● The granting of a right to all union members to elect their union's governing body by ballot. The right would be permissive, not prescriptive - "if it were abridged or denied it would be for the trade union members concerned to bring an action in the courts."

Mr Tebbit is not attracted to legislation to allow companies to lay off workers without pay because of the effects of strikes elsewhere in industry - though he says he will keep it in reserve if the industrial relations climate deteriorates. He also presently does not favour legislation to decentralise wages, preferring the route of privatisation of services or parts of services - as the National Health Service.

Of his period as Employment Secretary, he said that he was able to introduce changes because "public opinion was ready for them - though I helped to create that opinion. A lot of people had been noticing that the emperor had no clothes but it was up to some rude fellow to point it out."

Fears on competitiveness lead to NEDC document delay

BY JOHN LLOYD

THE NATIONAL Economic Development Committee's controversial review of economic performance, published by Mr Neil Kinnock, Labour education spokesman over the weekend, is indeed an exceptionally gloomy document.

The document shows that:

- unemployment, roughly the same as the OECD average until 1979, took off sharply since then, increasing by 75 per cent compared with the OECD average of 33 per cent;

- the UK invests less than its competitors, and its capital productivity is lower;

- unit labour costs have risen sharply compared to competitor countries, especially between 1977 and 1980;

- productivity performance has been barely half the OECD average;
- UK spending on research and development is lower than in any other major economy;

- the UK Government spends less on education and training than any other major European country.

These trends, many of which appear unchanged or have even worsened during the Government's term of office, stand in contrast to Conservative claims that an upturn is now under way.

However, Mr Kinnock, who has reportedly only seen the minutes of the March NEDC meeting which discussed the review, appears only half right about the status and future of the document, and all concerned with the NEDC have expressed surprise that it should have become such a live election issue.

First, it is a review of past performance, stopping at 1982. In some respects, it offers small bits of cheer - as in the section on unemployment, which notes that the UK rate of increase in 1982 was lower than the OECD average.

It also shows that wage inflation has fallen sharply since 1980, and that the annual rate of change is equal to that of the U.S. and West Germany.

Second, while it is a fact that Sir Campbell Fraser, President of the CBI, said the review was "so gloom-

my that people would want to get the first boat out of the country," it appears that there has been no deliberate attempt at suppression.

The document had been agreed at staff level by Government, CBI and TUC, but the tenor of it caused the CBI to push for a two-month delay, while the NEDC staff added recommendations, to it on what should be done to improve performance.

These recommendations should have come to the Council meeting earlier this month, but were apparently not prepared in time - a fact which is not thought to have caused great dismay among any of the NEDC's partners.

The minutes of the meeting show that Mr Geoffrey Chandler, the NEDC's director general, expressed concern that a document which had been agreed at staff level should be "called off at a higher level." However, the reason for the delay, as far as can be ascertained, appears to have been the CBI's fears of its effect on UK competitiveness rather than Government fears of its effect on a forthcoming election.

Labour pledge on U.S. N-bases

By Ivor Owen

DISCUSSIONS aimed at securing the introduction of a new strategy for Nato would precede any decision by a Labour Government to close United States nuclear bases in Britain, Mr John Silkin, Labour's Shadow Defence Minister, stated last night.

Insisting that there was no question of U.S. forces being given their marching orders to leave Britain as soon as Labour Ministers took office, he declared that nobody in his right senses would decide such issues overnight.

Mr Silkin, replying to questions in a television programme on nuclear weapons policy, stressed: "There are always discussions and there are always negotiations."

Mr Michael Heseltine, the Defence Secretary, accepted that there was "very serious unease and anxiety about the whole nuclear issue" but claimed that the overwhelming mass of voters in Britain still supported the policy followed by successive British Governments since the Second World War, based on membership of Nato and the need for "a nuclear backing" for the conventional forces.

Dr David Owen, for the SDP-Liberal Alliance, warned that the negotiations with the Soviet Union, in which the Nato powers sought an arms reduction deal, which made it unnecessary for U.S. Cruise missiles to be deployed in Europe, would be "tough."

He underlined his preference for Nato adopting a nuclear weapons policy based on "no early use" rather than a "no first use."

OPINION POLLS STILL GIVE THE CONSERVATIVES A FIRM LEAD

Charting the parties' progress

BY PETER PULZER

IS IT moving or isn't it? It sounds like the Inquisition's question to Galileo, and the best one can do is to opt for the ambiguous mumble that the great man thought it prudent to offer to his tormentors.

In the middle of last week it looked as though there was some movement there seemed to be more single-figure opinion poll leads than double-figure for the Conservatives over Labour. However, the 13 per cent Marplan lead in yesterday's Sunday Mirror and the 15 per cent MORI lead in the Sunday Times, appear to have put paid to that, compared with only one single-figure lead, the 9 per cent recorded by Harris/ORC for The Observer.

There are a number of difficulties in disentangling these clues. The first consists of comparing like with like. The order of publication does not always coincide with the order of field work; MORI's interviews, for instance, were done on Tuesday and Wednesday, Marplan's on Friday. The frequency with which each organisation takes its polls also varies, and since addicts have come to know each of the organisations' little idiosyncrasies one should ideally compare one NOP with another.

As an example, during the 1981 surge for the Alliance, Gallup tended to report somewhat higher ratings for it than other polls, but the trendlines were on the whole parallel. Moreover, Gallup, unlike its rivals, often asked an "Alliance reminder" question, in addition to offering Liberal and SDP choices, which generally produced slightly different answers. So the safe thing to do was to compare Gallup with Gallup and not to draw one graph with figures from every organisation.

Poll and date	OPINION POLLS RESULTS					
	Sample size	Cons	Lab	SDP Lib	Others	Cons lead
Range of eight taken May 5/12 1983		45/52	31/38	15/21	0/2	8/21
MORI (Standard)	1,824	48	32	22	0	14
May 5/11 Gallup (Telegraph)	946	46	33	19	2	13
May 11/16 MORI (Star)	1,090	44	37	17	2	7
May 16 Audience Selection (TV-am) May 16	1,154	46	31	21	2	15
NOP (Mail)	1,584	49	31	19	1	18
May 16/17 Audience Selection (Sun) May 17	507	44	33	21	2	11
MORI (Express)	1,100	46	37	16	1	9
May 19 Harris Research (TV-Eye)	1,053	45	35	17	3	10
May 17/18 MORI panel (Sunday Times)	960	47	30	21	2	17
May 17/18 Harris Research (Observer)	1,082	45	36	18	1	9
May 19/20 Marplan (Sunday Mirror)	1,250	47	34	18	1	13
General Election May 9		45	38	14 (Lib)	3	7

A further obstacle is that there is more than one method of choosing a sample. Purist statisticians prefer random sampling (i.e. taking every 500th name on the electoral register), but this is slow and expensive. Most polls now use quota samples, which leaves more discretion to the individual interviewer.

Recently telephone polling has come back into favour, after a long period of discredit. Telephone polling got a bad name in 1935 when the Literary Digest of America, having polled its members, forecast the defeat of Roosevelt, having got the result right four years earlier. Since readers of the Literary Digest and telephone users were predominantly middle class, what had been a politically representative sample

before the New Deal had ceased to be one four years later.

However, a telephone poll forecast the result of the Bermondsey by-election quite accurately. The reason for this may be partly because most people now have telephones, but also because polling organisations now know how to compensate for any distortions that their methods may introduce.

Bearing this in mind, it is possible to trace the movements of opinion in the first ten days of the campaign. Thus it appears that since the announcement of the election the gap between Labour and Conservatives has narrowed slightly, while the Alliance's position has remained unchanged. The earlier Labour surge, which gave it its rela-

tively good local government election results, however, has come to an end.

This is likely to give little comfort to the opposition parties. But opinion polls ask more than "how would you vote?" questions, and the answers to some of these are a little more cheering to Labour and the Alliance.

The Liberal/Social Democratic Party Alliance parties have always argued that it is campaign exposure that will give them the lift in the polls that they expect, as did indeed happen in 1964, 1974 and 1979, when the Liberals' ratings rose substantially in the final stages of the campaign. Alliance voting intentions at the moment remain obstinately flat, but their leaders' ratings have risen perceptibly, as, to a lesser extent, have those of Mr Michael Foot, the Labour leader.

On issue handling, the message is more mixed. The Alliance shows small rises on six issues, including unemployment and public services (Harris: Weekend World) and on the EEC and defence (MORI). Labour is also up on unemployment and public services (Weekend World), but down, though still ahead, on these topics according to MORI. But both polls report the Conservatives gaining on a greater number of issues than either of the other parties.

What the verdicts on issues signify is a general hardening of commitments as the campaign progresses, rather than shifts in allegiance. The proportion of electors who have still to make up their minds is now under 20 per cent according to all the polls that ask that question. That leaves both Labour and the Alliance fewer votes to play for - unless of course, those who think they have made up their minds turn out not to have done so. The author is tutor in Politics at Christ Church, Oxford.

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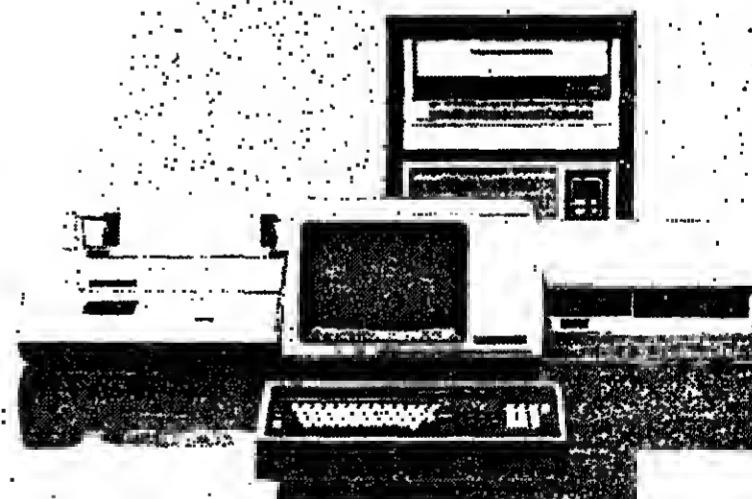
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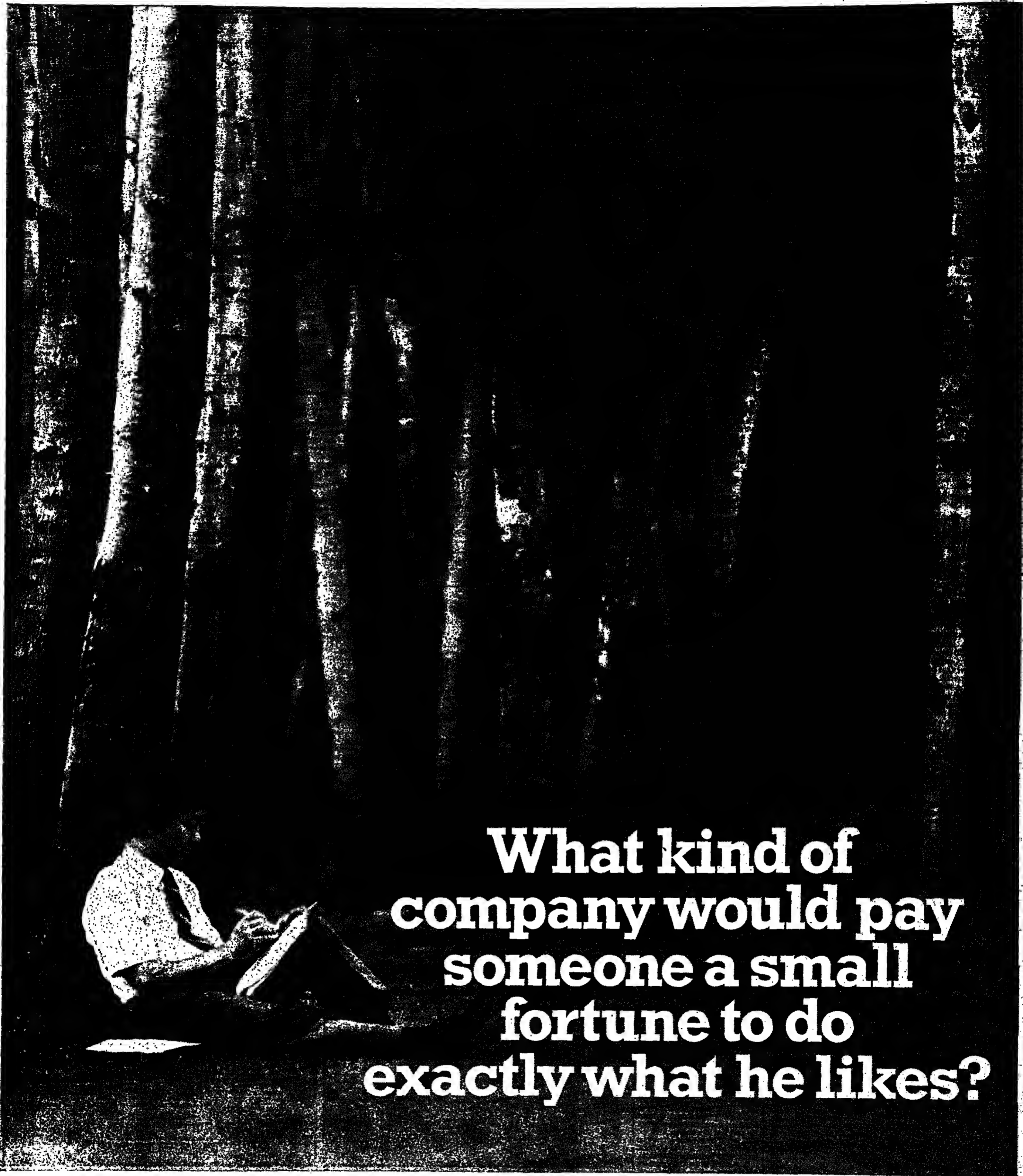
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BUILDING AND CIVIL ENGINEERING

ADVISING THE PARTIES

Industry policy package

THE Federation of Civil Engineering Contractors and the National Contractors and Building Trades Employers have submitted a seven-point package of policy requirements to Conservative, Labour and Alliance candidates contesting the general election.

Conservatives are told not to relax on capital underpinning. Government attempts to solve the problem of underpinning by local authorities since last autumn are described by the builders as "too little and too late" even though they acknowledge that public works construction orders since then have been coming out at the fastest rate for five years.

The former government party is also told that the industry wants better public investment management and more construction contracts.

Labour's proposed 50 per cent immediate rise in housing investment would "burst the balloon", what the industry bodies ask for here is a steady commitment of increases averaging around 10 per cent in

each of the next five years.

If Labour is proposing to remove the requirements on local authority direct works departments (DLOs) to obtain the majority of their work from the local authority on competitive tender, says another message, then this is a regressive step. The party is asked to abandon this threat.

It is also told that its proposals to "decentralise" a construction industry unique for its mobility is outdated and

would undermine existing and successful employer-union negotiating machinery.

The Alliance is commended for its proposal to boost construction investment by £1bn in its first year of office and advised to increase it steadily over several years. However, it is noted that the Alliance has voted against consent of the competitive tendering provisions for DLOs; it is asked not to relax competitive tendering rules. **WILLIAM COCHRANE**

When the recession struck in 1980 Germany's construction industry was already operating at some 30 per cent below capacity. It was also heavily dependent on public works, and public spending was one of the first sectors to be slashed. The results were dramatic.

In 1980, 1,041 building firms went out of business, in 1981, 1,515 and in 1982, 2,020. Last year the volume of orders for the major contractors was 25 per cent below that of 1979, employment of plant was at 55 per cent of 1979's level and labour employment in 1982 was 1,050m against nearly 1.3m in 1980. At the start of this year the total order book was an average 7 per cent down on the start of 1982, while public works orders were 17 per cent down.

To survive, contractors had to scramble for work, concluding fixed price contracts at prices which were frequently below current costs at a time when these costs were already rising by an average of 5 per cent a year. While that was a valid policy for weathering the recession, it could mean bankruptcy in a recovery.

Under normal circumstances increased demand for building would tend to push up both costs and prices. But the nature of the recovery in Germany so far makes it likely that costs

from the refrigeration used for storing frozen and chilled foods was partially reclaimed and used to heat the warehouse.

ADG engineers decided that there was no reason why one large condenser coil should not replace the units now installed on the roof and in the warehouse.

This unit could be installed within a centralised air handling plant providing the store sales area and warehouse. The unit is mounted on the roof of the preparation area, next to the refrigeration compressor room.

The air handling unit, built by Wansons to ADG designs, introduces ducted air at high level in the store adjacent to the checkout area, so that the staff here receive the bulk of the heated air.

A portion of the air is taken to the warehouse at high level. Two fans, mounted in the corner of the warehouse, draw air from both the warehouse and the store. This is passed through the air handling unit picking up heat and a percentage of fresh air before returning to the sales area and warehouse.

The unit includes a hot water generator, also using waste heat. An indirect gas fired heater has been installed as a standby facility, but has proved to be hardly necessary.

ADG engineers hope that with the ever increasing need for refrigeration the system can be extended to provide heat for the offices as well. **TONY FRANCE**

According to Tom Garry, ADG's director of engineering services, "We believe that this development will play a major role in combating the problem of rising fuel costs in superstore operations. Our calculations have shown that it will be possible by using this system to save more than £300,000 a year on the heating bill of these new stores."

The new system was developed from previous installations in which the heat rejected

heating bill.

In addition, the system is considerably cheaper to buy and install than the previous method of indirect oil-fired roof-mounted air heaters, producing further savings of up to £40,000 per installation.

The Asda system uses well-proven commercial components supplied by the company's refrigeration and heating insulation contractors, who have been working on the new stores—R.E.A. Bott, W. H. O'Gorman, and Wansons.

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GERMAN CONSTRUCTION

Recovery too late for many

THE APPARENT recovery in Germany's construction sector has come too late for the 4,000-odd building firms which have gone out of business in the current slump. It is also threatening the existence of those contractors who successfully managed to weather it.

The key to this contrary situation lies both in the depth of the building recession over the last three years and in the nature of the uplift in domestic building activity so far this year.

When the recession struck in 1980 Germany's construction industry was already operating at some 30 per cent below capacity. It was also heavily dependent on public works, and public spending was one of the first sectors to be slashed. The results were dramatic.

In 1980, 1,041 building firms went out of business, in 1981, 1,515 and in 1982, 2,020. Last year the volume of orders for the major contractors was 25 per cent below that of 1979, employment of plant was at 55 per cent of 1979's level and labour employment in 1982 was 1,050m against nearly 1.3m in 1980. At the start of this year the total order book was an average 7 per cent down on the start of 1982, while public works orders were 17 per cent down.

To survive, contractors had to scramble for work, concluding fixed price contracts at prices which were frequently below current costs at a time when these costs were already rising by an average of 5 per cent a year. While that was a valid policy for weathering the recession, it could mean bankruptcy in a recovery.

Under normal circumstances increased demand for building would tend to push up both costs and prices. But the nature of the recovery in Germany so far makes it likely that costs

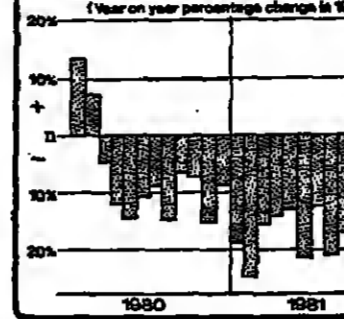
will rise but that prices will stagnate or fall even further. Although there appears to have been a dramatic increase in orders from the end of last year, these have been primarily in the housing sector, to the extent that it now makes up nearly 50 per cent of the total building volume. With the rise in activity, costs in building are rising and spilling over into the other construction sectors.

But only some 10 per cent of

GOOD NEWS...

BUILDING INDUSTRY ORDER BOOK

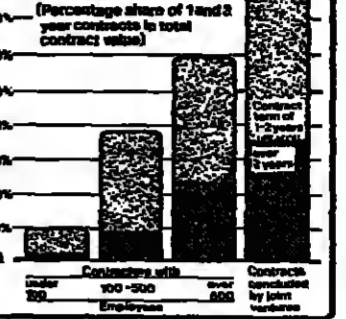
(Year on year percentage change in 1978 prices)



BAD NEWS...

CONTRACT LIFE

(Percentage share of 1 and 2 year contracts to total contracts value)



Germany's construction companies are involved in the housing sector. On the civil engineering side, contractors are now being subjected to costs pressure from the housing sector without feeling any benefit in increased demand for their services, leaving them in the same unhappy position of excess capacity and low prices.

Nor is there much hope in prospect for those companies which depend on public spend-

ing for the larger part of their business. The local authorities in Germany, which award two-thirds of all publicly financed projects, forecast a 4-5 per cent fall in building financed by them this year. But even if public spending on construction was increased, its effects would be to add to the costs pressure on those contractors which concluded fixed price contracts last year.

Figures compiled by the Ifo

Management Institute show that in 1979, 59 per cent of the contracts concluded by contractors with 500 or more employees had a term of over one year and 22 per cent a term of over two years. For contractors with 100-500 employees the shares were 37 and 7 per cent respectively.

On that basis, on average of 48 per cent of the below-cost, fixed price contracts concluded in 1982 will not be completed until 1983 and nearly 50 per cent will not be completed until 1984—both years in which costs are expected to rise rapidly if the recovery continues.

The position is even worse for contractors involved in joint contracts, with 85 per cent of orders having a term of over one year and 35 per cent a term of over two years. "It is difficult to see," says Dr Gunther Herion, president of the main contractors' association IVB, "how these low price contracts can accommodate rising costs. Fixed price contracts concluded in 1982 could well end in bankruptcies in 1984 or 1985."

TOM SEALY

CONTRACTS

£15m work for Tarmac

Motorway works head a list of contracts, totalling £15m, awarded to TARMAC CONSTRUCTION. The motorway contract, worth about £3.1m, is for reconstructing the south-bound carriageway of the M1 between junctions 15 and 16 in Northamptonshire for the County Council. At Linton, Tarmac has a £1.7m contract for a supermarket, plant room, three

sheep units and associated ancillary works for Sandell. Other contracts awarded include: small industrial units at the University of Warwick, Coventry, for Barclays Bank (£860,000); an office and workshop at Longman Estate, Inverness, for Highland Regional Council (£330,000); and a warehouse at Broxburn, Lothian, for Arthur Bell and Sons (£891,000).

In the first quarter of 1983 the WILLIAM STEWARD GROUP has received orders for UK

electrical/mechanical contracting and manufacturing divisions of £8.4m. Largest is at R. S. Components, Corby, worth over £1m.

Leeds-based MANSTON (CONTRACTORS), part of the construction division of the Espley-Tyas property group, has won two superstore contracts totalling £4m. The first is to build an 88,000 sq ft superstore complex at Wakefield for Asda Stores, and at Heywood in Lancashire, Manston has begun work on another superstore, this time of 50,000 sq ft, for Wm Morrison Supermarkets.

Stores save heat cost

REDUCED ENERGY consumption has become a serious preoccupation with the engineers of ADG (Property Services), the store design and development arm of the Associated Dairies Group.

The group is now well ahead with a major building programme. Twelve Asda superstores (25,000 sq ft or over sales area) have recently been completed and five more are under construction. Asda, which used to be known as a Northern stores group, now has new premises from Halifax to Tilbury, and Norwich to Gloucester.

In all these stores ADG engineers have installed a heat reclaim system which was developed within the group. It uses waste heat extracted from the store's refrigeration system to provide a comfortable shopping and sales area.

Combining with efficient building insulation, by using the units the company says it is achieving savings of up to £14,000 a year on a typical store

heating bill.

In addition, the system is considerably cheaper to buy and install than the previous method of indirect oil-fired roof-mounted air heaters, producing further savings of up to £40,000 per installation.

The Asda system uses well-proven commercial components supplied by the company's refrigeration and heating insulation contractors, who have been working on the new stores—R.E.A. Bott, W. H. O'Gorman, and Wansons.

According to Tom Garry, ADG's director of engineering services, "We believe that this development will play a major role in combating the problem of rising fuel costs in superstore operations. Our calculations have shown that it will be possible by using this system to save more than £300,000 a year on the heating bill of these new stores."

The new system was developed from previous installations in which the heat rejected

Sewer pipe in a gas main

A DRAMATIC first in sewerage construction is claimed by the Southern Water Authority for its installation of a 30 ins diameter sewerage pipe along the seafront at Hastings without digging a single trench. The scheme is remarkable because two miles of high density polyethylene pipe is being laid inside a disused gas main.

Sections of the plastic pipe are being welded together,

then fed into the old iron gas main at a central point before being pulled through by a powerful winch.

As well as benefits to the town of Hastings and the local traffic, this method of construction has meant that the cost of the work has been reduced from £1.1m using conventional methods to a figure of £500,000, a saving of more than 50 per cent.

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THE BETTER WAY TO BUILD

Over the last 30 years we have developed our expertise in both steel and timber framed construction. Operating from our 58 acre site near the M1 in the heart of the Midlands, we are able to offer a complete range of buildings and services.

These include timber construction and our new steel fabrication line. Both backed by our own comprehensive professional team, experienced in all forms of building design from steel and timber structures to components. Particularly useful as Hallam are often called upon to act as management contractors, working together with our clients and their professional advisers from design stage to project completion. We are also able to act as sub-contractors, manufacturing, supplying, delivering and erecting structures for both steel and timber framed buildings.

The Hallam method of building has been developed to allow maximum design flexibility, providing the ideal answer for schools, hospitals, offices, factories, warehousing etc. For further information about a better way to solve your building problems send now for your colour brochure.



Please send me my System Building Brochure.

Name: _____

Position: _____

Company: _____

Address: _____

Tel: _____

FT23/5

We may not be the 1st name you think of, but we'll be 2nd to none on your short list.

In fourteen years, Data General has supplied 120,000 computers worldwide.

We have supplied over 10,000 systems in the UK. We are among the Fortune 500.

Our computers from the desktop CS/5 to the superMV10000 are compatible throughout the range.

They're also compatible with some rival systems. (Which is very cost effective when you're linking our computers to systems other than ours.)

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Backed by very comprehensive support contracts.

The new MV10000 is the most powerful computer in Data General's Eclipse family—16 megabyte main memory and up to 18.5 gigabytes of online storage. It is the industry's fastest 32 bit virtual memory computer, and is capable of supporting up to 192 workstations.



We'll even provide a 99% up-time guarantee for your system. Which not only demonstrates our confidence, but says quite a lot for our equipment's reliability.

Next time you're putting a computer system out to tender you'll probably think of your previous supplier first.

Think of Data General second.

We're rarely in that position when it comes to the best solution.

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Marketing Communications Division, Data General Ltd, Hounslow House, 724-734 London Road, Hounslow, Middlesex TW3 1PD.

I want goods that deliver the goods. Please send details of your Eclipse-based systems.

Name _____

Position _____

Company _____

Address _____

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FT/2315/53

Data General
COMPUTERS

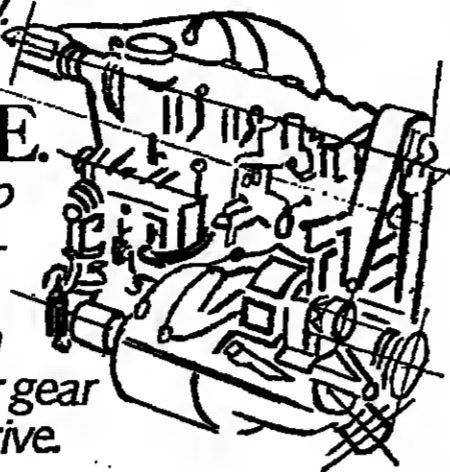
We deliver the goods that deliver the goods.

Meet the Nova. Vauxhall's new little car. A car designed to do a lot, a little better.

Its imaginative design has achieved a greater sense of space in a quieter interior. And a new generation of engines offer more power, more punch and more economy.

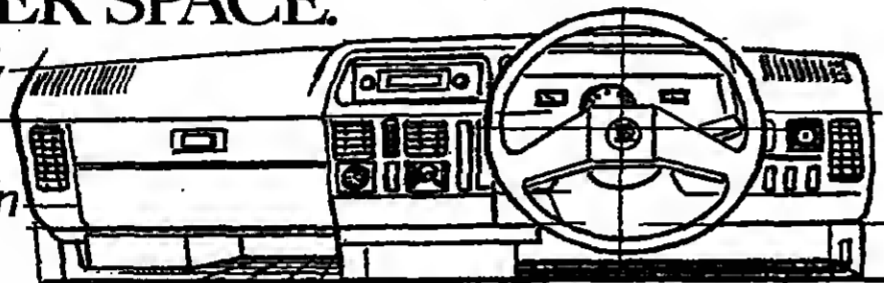
BETTER TO DRIVE.

Even in third gear, the Nova will zip from 15mph to 65mph and back again without the slightest hesitation from the engine. An achievement made possible by the design concept of Low End Torque (LET). With fewer gear changes, the Nova's easier and punchier to drive.



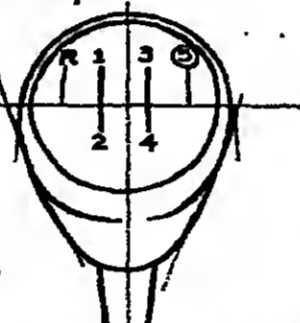
BETTER SPACE.

Within modest inches, the Nova is deceptively large. Its wide doors open wider than its major competitors. Likewise, it offers the driver better headroom, better legroom and better hiproom.

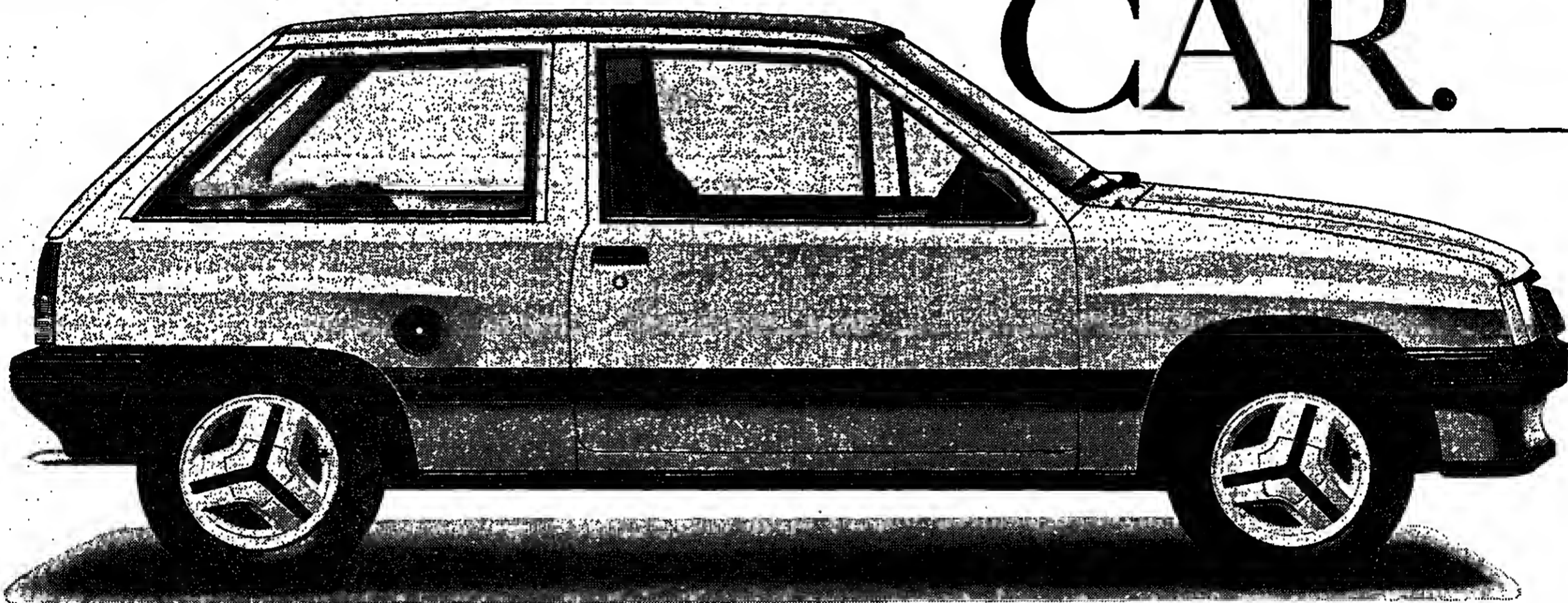


BETTER ECONOMY.

With the aid of better aerodynamics, the Nova's 1.0 and 1.2 litre LET engines deliver 57.6mpg at 56mph. And 60.1mpg with the 5-speed gearbox, available as an extra cost option.

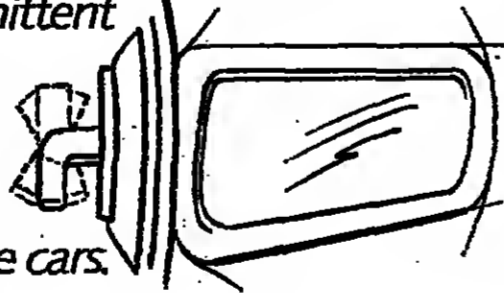


THE NEW VAUXHALL NOVA. THE LITTLE BETTER CAR.



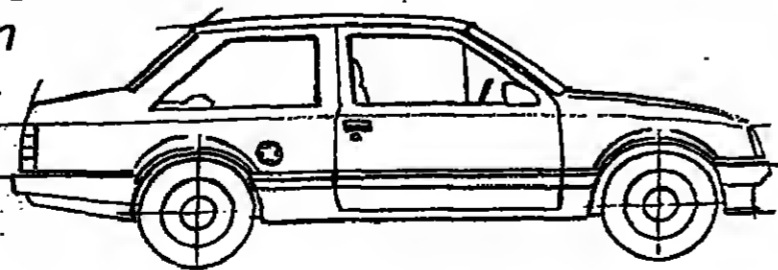
BETTER EQUIPMENT.

In striking contrast to other small cars, the Nova features a fully integrated dashboard. Every model has power brakes, a laminated windscreen and halogen headlamps. There's an intermittent rear wash wipe on hatchbacks. And on L models, there's a push button radio and a drivers door mirror that adjusts from inside the car. All touches of luxury traditionally found only on more expensive cars.



BETTER CHOICE.

The Nova is not one car but two. The saloon offers an enormous boot of 15.2 cu.ft. which is even bigger than you'll find on a lot of much larger family saloons.



FROM £3,496. Until now a modest price meant a basic car. Nova marks the turning point. We offer all of its refinement in 4 models, from just £3,496 to £4,273. The Nova is waiting for you to test drive at your friendly Vauxhall-Opel dealer.



BETTER. BY DESIGN.



BACKED BY THE WORLDWIDE
RESOURCES OF GENERAL MOTORS

ILLUSTRATED: NOVA L HATCHBACK £4273. DASHBOARD FROM NOVA L. ALLOY WHEELS SHOWN ARE AN EXTRA COST OPTION. ALL PRICES, CORRECT AT TIME OF GOING TO PRESS, INCLUDE CAR TAX AND VAT. DELIVERY AND NUMBER PLATES EXTRA. DOT FUEL CONSUMPTION FIGURES MPG (L/100KM). NOVA L0: CONSTANT 56 MPH: 57.6(4.9); CONSTANT 75 MPH: 42.8(6.6); URBAN CYCLE: 37.7(7.5). NOVA L2: CONSTANT 56 MPH: 57.6(4.9); CONSTANT 75 MPH: 43.6(6.5); URBAN CYCLE: 34.0(8.3). NOVA L0 5 SPEED: CONSTANT 56 MPH: 60.1(4.7); CONSTANT 75 MPH: 44.0(6.4); URBAN CYCLE: 37.1(7.6). NOVA L2 5 SPEED: CONSTANT 56 MPH: 60.1(4.7); CONSTANT 75 MPH: 44.8(6.3); URBAN CYCLE: 33.2(8.5).

TECHNOLOGY

EDITED BY ALAN CANE

MASS TRANSIT SYSTEM AT A FRACTION OF PRESENT COSTS

Flyda seeks slice of the cake

BY ELAINE WILLIAMS

FRANCIS FERROTT is an ex-naval officer and engineer who decided that he could design urban mass transit systems for the fraction of a cost of traditional transport.

So he set up a company called Flyda to put his theories into practice. Partly funded by himself and Electra Risk Capital, the company hopes to eventually take a large slice of the mass transit market which is currently worth around U.S.\$7bn a year.

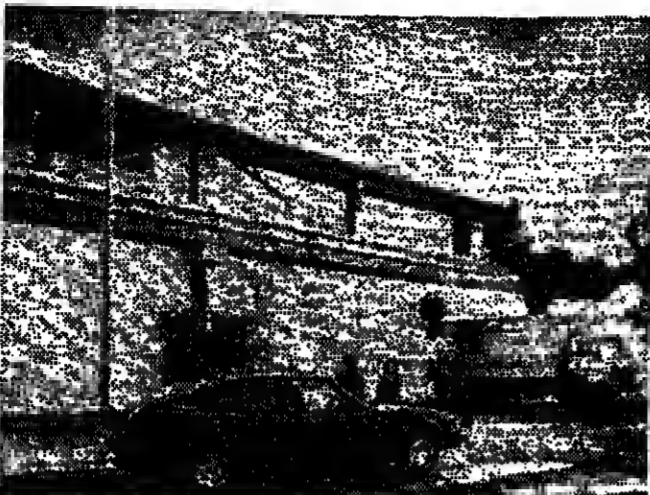
The Flyda system consists of lightweight, quiet, rubber-tired vehicles powered by electric motors capable of carrying 12 passengers each. These are cantilevered from overhead guideways. Narrow elevated steel or concrete bridge structures will support the elevated tracks which are only 1.5 metres to 2 metres wide.

Elevated
The light bridging span of the elevated track has a 70 cm diameter supports spaced between 12 and 30 metres. The company says that other transit systems need large construction up to 8 metres wide for their elevated runways. Trains can be cantilevered from either side of the guideway. A simple roof mounted "switch wheel" allows trains to select tracks on elevated guideways or on the ground so that no moving parts are needed on the track itself.

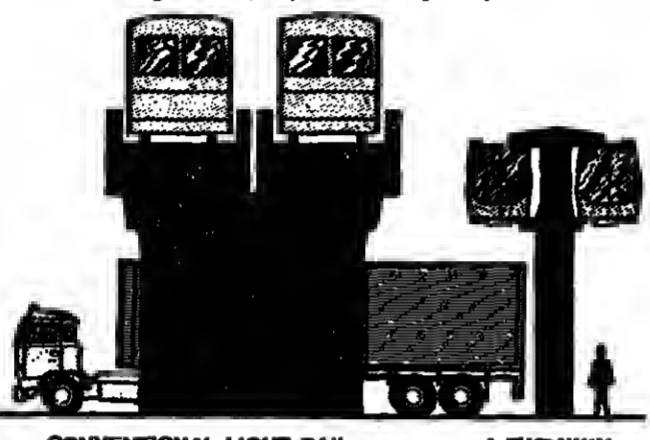
Such a system, says Mr John Emanuel, Flyda's marketing director, would cost around 40 per cent of a comparable elevated system and a mere 10 per cent of the cost to build an underground railway system. Depending on the capacity and situation of the transit system the cost for a Flyda network would average out between U.S.\$3m and U.S.\$12m per km of track. Even so, Mr Emanuel says that the system would be capable of handling the traffic capacity of the London underground, for example.

Basic

Typical costs for a conventional elevated system cost between U.S.\$25m to U.S.\$40m per km while underground construction costs U.S.\$50m to U.S.\$120m per km, says Mr Emanuel. A basic ground transportation is the cheapest of all costing between U.S.\$1m



Above: The Flyda Pre-cast Concrete Track with Flyda-craft. Below: A comparison between conventional elevated light rail (left) and a "Flyda-way."



CONVENTIONAL LIGHT RAIL A FLYDAWAY

and U.S.\$5m. Flyda has estimated that its system could run economically with a train interval of about one minute. With trains made up of vehicles carrying between 12 and 20 passengers, it is possible to adjust train lengths according to time of day. Since they are computer controlled, it will be possible to operate an off-peak passenger demand service. A prototype system is now being constructed which should be ready for demonstration in September. The first passenger vehicle is being built by International Automotive Development, Ltd, specialists in prototype vehicle building, based at Worthing. This will be tested on a 250 metre indoor track,

company hopes that a car manufacturer would take over the manufacture of the passenger vehicles once mass production orders had been received. Reliant has already shown interest in being involved with the Flyda in this respect. The company is very confident that it has placed in the mass transport business.

Several transport authorities in North America, Europe and Asia have expressed interest in Flyda's concept and are now awaiting the operation of the prototype system before any firm commitments are made, says Mr Emanuel.

The company has also started bidding for contracts in the UK. It hopes to bid for the London Docklands light rail transit system in partnership with a major civil engineering company. Flyda reckons that it could cut as much as £30m off the budgeted cost of £265m to build it.

At present Flyda has to prove that it can provide an efficient, safe and low-cost mass transit system which has a minimal effect on the environment as Mr Ferrott claims. If the company does get off the ground, in every sense of the word, it could create opportunities for up to 20,000 jobs in the UK with an output of about 20,000 vehicles a year by the end of the decade.

Banking Transfer service

BANKERS' AUTOMATED Clearing Services (BACS) the UK banks electronic funds transfer service will now allow corporate customers to transfer debit or credit transactions over the telephone, thus saving the transport costs of moving magnetic tapes or discs to the BACS computer centres. Companies will be able to transmit instructions either at prearranged times or at will throughout the day. The new system, BACSTEL, will cost no more than any other form of electronic funds transfer and reporting back to confirm transactions is instantaneous, Mr Derek Balfour of BACS Marketing Department claims. BACS is on 01-626 3486.

AMBITION SOFTWARE SUPPORT COMPANY

£400,000 venture capital for Sphinx

BY TIM DICKSON

AN AMBITIOUS new software support company—headed by former Zilog European marketing manager, Pamela Geisler, has just been launched with £400,000 of venture capital backing.

The aim of Sphinx—as the new business is called—will be to market and support software based on the Unix operating system and, once this is established, move into promoting "turnkey" systems.

Money for what is a substantial start up by any standards is being put up by two venture capitalists—other APA Venture Capital Fund and Abingworth, a company which is planning an Unilever Securities Market listing.

Tempted

Each is contributing £200,000, but in line with what APA claims is now common practice in the U.S. the share of the equity which they have bought is not at this stage being disclosed. The management team, which includes another APA Zilog executive, holds a controlling interest.

Geisler has been tempted into setting up on her own by the high degree of interest in Unix, a microcomputer language the appeal of which lies in its multi-user facilities, its portability across machines from different manufacturers and the wealth of system development aids.

IBM and the Digital Equipment Company (DEC) (Unix was developed by Bell Labs on its PDP-11 mini computer), have both recently announced that it will be available shortly on their machines.

While many academics beg to differ, there is a widespread feeling, shared by the founders of Sphinx, that Unix will inevitably become the standard operating system for 16 and 32 bit microcomputers.

"Unix operating systems are being adapted by the majority



Mr Peter Englander, APA, Dr Pamela Geisler of Sphinx and Mr Ronald Cohen, Managing Director of APA, signing the documents for the launch of Sphinx.

of manufacturers," says Dr Doug Eytens, director general of the Computing Services Association. "When IBM and DEC move the world is likely to follow."

"There is certainly a shortage of companies concentrating just on Unix software. I would say that Sphinx is on a good wicket." Initially, the new company will distribute tools and applications software to run on Unix machines. Sphinx will not develop software, rather it will publish, package, actively market and support software sourced in the UK and the U.S.

Besides expressing confidence in the future of Unix, Geisler feels Sphinx represents the first centralised supply resource for the system in the UK. Target

customers will be OEMs, distributors, large end users and other software houses.

Leading manufacturers or agents of Unix-based microcomputers include Flexus, Wicat, Altos, Tandy and Fortune and Bleasdale. Sphinx has contacts, meanwhile, with Keen Computers, Thame Systems and Encotel Systems which are the leading distributors of Unix machines and systems in the UK.

"The first aim will be to gather up the best software products and sell them; then we will find ones which need a certain amount of co-operative effort and offer a marketing service; and finally, we will directly commission products for which we feel there is strong potential," says Geisler. APA has clearly been im-

pressed by Geisler's knowledge of the hardware market, her contacts in the industry and her appreciation of end user software requirements. But in turn APA's Peter Englander has contributed more than just money—having sounded out industry experts on the likely markets for the new service and helped build the management team in advance of the launch.

The APA Venture Capital Fund which has now committed more than £3m of its £10m total resources had already invested in computers but also takes equity stakes in non-technology companies. Investments include Encotel Systems, Systematics (the microcomputer software company) and My Kinda Town, the company which owns the Chicago-Pizza Pie Factory.

Competition Engineers' design contest

THREE of Britain's top engineering people are to judge a nationwide engineering design competition—the Archimedes Awards—for which entries are now being sought. They are Sir Monty Finlaison, former chairman of British Steel and author of the Finlaison Report on the engineering profession; Clive Sinclair, chairman of Sinclair Research and the man behind the world's fastest selling line of home computers; and E. A. L. Hyde, the recently retired Director of Research, British Aerospace Corporation, and now a consultant.

Exploits

British manufacturing companies are invited to submit entries in three categories chosen to reflect current challenges in engineering design. These are: the best technical innovation in a new or redesigned product; the most innovative advance in product design made possible by incorporating electronic control; and the finest example of a product which exploits a new manufacturing technique or process.

The judges will select three finalists in each category with the eventual winners being chosen by a postal ballot among the readers of Eureka.

the engineering design journal. The awards will be presented at a dinner in Birmingham on October 4, the opening day of the Design Engineering Show at the NEC.

For entry details contact Eureka on 0322 77755.

Printing Bottle specialists

SCREENLINE, a relatively new London company that specialises in printing on bottles and containers has had its first export orders from India and Pakistan for a recently introduced machine that can handle a wide range of items at high speed.

Designated 455/GB/3, the machine can handle diameters between 35 and 100 mm and heights from 100 to 300 mm. The throughput varies from 20 to 80 bottles per minute.

Employing three screen printing heads that can deal with both the front and back of the bottle in one pass, the machine is completely integrated mechanically and is driven by one variable speed motor.

After installation, no timing adjustments are needed whatever speed or bottle size

is selected, and the machine is able to operate on a three shift basis. More on 01/741 0441.

Cameras Graphics

A MICROCOMPUTER controlled camera for use in the print and graphics industry has been launched by Halcos Suburb, the UK based company. The company has been working closely with an electronics company, Ash Electronics, to develop the new camera which is designated the Coplyn SASA. Halcos is hopeful to break the foreign domination of this market by its low cost but

sophisticated product. It represents the largest investment ever made by the company. More details of the product on 0784 61332.

Photocopiers Volume

A STATISTICAL multiplexer for use with the VAX and PDP-11 range of computers have been launched by the Digital Equipment Corporation. It allows up to eight asynchronous terminals to be connected to the computer. DEC says that the multiplexer is compatible with its existing DZLL 8-line interface and dramatically cuts modem and line costs.

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Tel (0534) 64123 Ext 328 or 360

CONTRACTS AND TENDERS

AMENDED NOTICE
GUYANA SUGAR CORPORATION LIMITED
INVITATION TO TENDER TO
FIELD AND FACTORY EQUIPMENT
AGRICULTURAL SECTOR LOAN
GUYANA SUGAR CORPORATION LIMITED

Tenders are hereby invited from suppliers for provision of field and factory equipment to be acquired under the referenced loan. The International Development Bank is partially funding a rehabilitation programme under Loan Contract 6001SF-GY through its fund for special operations. The tenderers are invited to submit their bids for the equipment specified in the schedule of items attached to this notice. The details of the equipment to be supplied are set out in the schedule of items attached to this notice. The details of the equipment to be supplied are set out in the schedule of items attached to this notice.

LOT A FIELD EQUIPMENT
A1 - Thirty-seven (37) Tractors up to 100 hp
A2 - Fourteen (14) Tractors above 100 hp
A3 - Earth moving equipment
A4 - Agricultural implements
A5 - Field camps

LOT B FACTORY EQUIPMENT
B1 - Electric motors
B2 - Complete mud filters
B3 - Machine tools
B4 - Indicator and control systems

Specifications contained in the tender document permit offers of alternate equipment which have similar characteristics and provide equal performance and quality to those stated.

Tenders documents can be obtained at the office of:
Guyana Sugar Corporation Limited
15-20 St Paul Street
Georgetown, Guyana
Tel: 210 55N

or
Guyana Sugar Corporation Limited
22 Church Street
Georgetown, Guyana
on request, applicants are required to pay of Guyana dollars 100 or equivalent in foreign exchange in favour of the Guyana Sugar Corporation.

Amendments to the original tender documents will be circulated. Tenderers who have already submitted a bid in response to the original call for tenders and have not received their original bid or alternate new bid. This new bid will supersede the original bid.

Tenders shall be in English and enclosed in plain sealed envelopes which in the left hand corner shall be marked as follows:

Sealed Envelope
Tender for Field and Factory Equipment
Agricultural Sector Loan
Guyana Sugar Corporation Limited
Main and Warehouse Street
Georgetown, Guyana

Tenders close at 14.00 hours (2 p.m.) Guyana time on Wednesday August 3, 1983. Tenderers or representatives may be present at the opening of the tenders.

A. V. LICK
Finance Director
Guyana Sugar Corporation Limited
15-20 St Paul Street
Georgetown, Guyana
South America

REPUBLIQUE ALGERIENNE DEMOCRATIQUE ET POPULAIRE

(Algerian Popular Democratic Republic)
MINISTRE DE L'ENERGIE ET DES INDUSTRIES
PETROCHIMIQUES
(Ministry for Energy and Petrochemical Industries)
ENTREPRISE NATIONALE DES TRAVAUX AUX Puits
(National Company for the Exploitation of Oil Wells)

ADVICE OF EXTENSION OF TENDER

The Entreprise Nationale des Travaux aux Puits: 2, Rue du Capitaine AZZOUZ - Côte Rouge - Hussein Day - ALGER ALGERIE (ALGERIA), wishes to inform interested companies that International Tender number 91-4AE/MF for the supply of:

01—GD Air Winch (Well Winch) type HMKL 61281
02—Electric Winch with electrically operated brake, make STONL type QC 2040 with Electric Motor
03—Injection head NAT. N. 815
04—12/16 Desanding Devices "on Skid"
05—12/16 Desanding Devices "on Skid"

The original closing date of which was 7 May 1983, has been extended to 18 June 1983.

COMPANY NOTICE**GADEK (Malaysia) BERHAD**

Notice of Meeting
NOTICE IS HEREBY GIVEN that the Fifth Annual General Meeting of the company will be held at Ladang Pinji, Lahat, Perak, Malaysia, on Saturday, 11th June, 1983, at 12.00 noon for the following purposes:

- To receive and adopt the accounts for the year ended 31st December, 1982, and the directors' and auditors' reports thereon.
- To sanction the payment of directors' fees.
- To re-elect directors.
- To appoint auditors and to authorise the directors to fix their remuneration.
- To transact any other ordinary business.

By Order of the Board
OH KIM SUN
MAK HING KWAI
Secretaries

Ladang Pinji
Lahat, Perak
Malaysia
23rd May, 1983

NOTES
(1) A member of the company entitled to attend and vote at the meeting is entitled to appoint a proxy to vote in his stead. A proxy need not be a member of the company but unless he is, then by the provisions of Section 149(1)(b) of the Companies Act 1965, he must be a qualified legal practitioner, an approved company auditor or a person approved by the Registrar of Companies.

(2) The instrument appointing a proxy must be deposited at the registered office of the company not less than 48 hours before the time set for the meeting.

PERSONAL

REMEMBER
A devoted friend with a tribute that blooms in lasting happiness for old and young. A loved one who is remembered in a loving way. Every year you give towards a Day of Remembrance in great need of a great gift. Please send your gift with the name you wish to commemorate to: The Memorial Fund, Room 114, 22 Dover Street, London W1A 2AP.

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VENTURE CAPITAL IN BRITAIN

The high-tech money bonanza

By Tim Dickson

RICHARD CROWN was a hot property in the City of London last month.

When word got around that his business, WordNet, needed new funds for development, no fewer than 16 possible backers apparently stepped forward. The object of their interest—a small device which links typewriters to word processors—had chalked up impressive sales in its first few months of production but further progress was being hampered by a lack of adequate working capital.

Besieged by offers on all sides Mr Crown opted to accept £250,000 from a relatively unknown investment company, Yelverton Investments—in exchange for 25 per cent of his shares in WordNet. A measure of the success of the deal is that later being bitterly disappointed that they had not landed the deal. And a measure of the range of terms offered is that one thought he stood a sporting chance of obtaining the same equity stake for exactly half as much money.

Such a story vividly illustrates the City's current passion for unquoted investments and its headlong dive over the last couple of years into "venture capital." Dozens of specialist funds are now hunting for business, merchant banks and certain investment trusts have stepped up their profile in the search for high-fliers, government agencies abound with "risk" money if you know where to look for it, and even banks, insurance companies and pension funds are occasionally throwing their traditional caution to the wind.

The competition for good investments is intense and those individuals with an exciting business plan and a dash of salesmanship are certainly making the most of it.

Yet while the private sector's reward in backing small companies has greatly improved, gaps in the market remain and important lessons still have to be learnt.

City institutions, for example, are still largely obsessed with the company which can show some sort of track record, requires between £100,000 and £1m, and enjoys above-average prospects (preferably based on a high technology product).

● Genuine start-ups as a result are generally shunned and the

supply of funds for experimental research and development projects is even more inadequate.

● Even those established companies which cannot project dramatic earnings growth continue to have trouble finding support.

● The UK, moreover, is at a relatively early stage in adopting the techniques and style of American venture capitalists.

Sometimes rather inelegantly called the "hands on" or "pro-active" approach, the American style of venture capital is distinguished by a high degree of involvement with the companies being backed, often to the extent of hiring managers, providing technical know-how and above all supplying marketing skills.

Venture Capital Journal, the bible of American venture capitalists, reckons that perhaps \$3.5bn has been invested in this way over the last five years in the United States and that, spurred by a reduction in capital gains tax in 1978 and the increasing use of new issue markets (which allow venture capitalists to cash in on their success) the pace has quickened in the last couple of years.

Details of the fortunes made by early investors in computer companies such as Apple and Tandem across the Atlantic that those in Europe were encouraged to believe that similar results could be achieved here.

By contrast to the 300 to 400 independent venture capital firms in the United States—each typically with between a couple of technically qualified partners as well as financial specialists—genuine venture capitalists in the UK are still few and far between.

Technical Development Capital (TDC), part of the Financial Industry Group (FTI) is certainly one. "We're geared up to put in at least 30 man days per year on each client," explains Geoff Taylor, general manager, who supervises a portfolio of 22 companies. "At the outset we probably spend a lot more time."



Ronald Cohen, managing director of the £10m APA Venture Capital Fund, agrees. He and his colleagues have just spent much of the last six months building a management team to run its latest computer software investment.

Perhaps the biggest force in the market is Advent Management, with some £20m of institutional money under its control in Advent Technology and Advent Eurofund.

David Cooksey, Advent's managing director, explains that his colleague Michael Moran has been despatched to California for a while to run a new San Diego subsidiary of Leeds-based Filtronics. "That's hands on if ever it was," Mr Cooksey said.

Most British and Continental institutional fund managers, on the other hand, are still characterised by the "win some, lose some" philosophy. This approach has long typified the UK merchant banks, which have tended to take the view that while a couple of companies in a portfolio of 10 may go bust, six may survive without doing anything spectacular (the "walking dead" in venture capital jargon) the dramatic performance of the other two will make the whole exercise worthwhile.

Some observers worry about all that enthusiasm for poten-

tially lucrative unquoted investments has attracted fund managers with little experience of backing new companies and little understanding of the risks involved.

Geoff Taylor at TDC believes that "the pendulum has probably swung too far" and that "there is bound to be a shake out in a couple of years' time when certain operators realise the extent of the risk."

Norwich Union's recent annual report underlined some of these risks. It disclosed that Castle Finance, the company's risk capital subsidiary, lost money last year. Gavin Mills, chief investment manager, confirms the group has already written off £1m in a portfolio which has £4m invested in 26 companies.

But he says the risks can be over emphasised. "We are well aware that you have to have strong nerves. Before we set up Castle we had, over the years, invested £7m in 42 unquoted companies in the UK, worth £16m-£17m. This proves you have to be patient."

In the U.S. venture capital funds have also developed strong nerves. But there too "there are venture capitalists chasing awfully hard to get money invested," said Gordon Moore, chairman and chief executive of Intel, in a recent

interview. "I believe they are supporting a lot of things that don't deserve support."

Increased specialisation, says Tony Lorenz, managing director of Equity Capital For Industry and vice-chairman of the British Venture Capital Association, can be one answer for funds. "Too many funds launched recently have too diffuse a purpose. Those that have a fine focus—towards any particular areas of high technology—are known in the market places and are still seeing a steady flow of sensible propositions."

But the largest and most experienced provider of long-term loan and equity finance for smaller companies, Industrial and Commercial Finance Corporation (ICFC) insists that it is holding its own against the competition. Its continued success owes much to sound marketing—a branch network, links with financial advisers and referrals from existing customers—but also to a greater readiness than most to back sound companies start-ups and not necessarily the go-go stocks of tomorrow.

Two gaps, however, remain. First sound companies whose capital base has been eroded over the years—by inflation or the recession—still find money hard to come by. The proposed Business Expansion Scheme, which allows individuals to claim tax relief on investments up to £40,000 a year in a wide range of established trading companies, is expected to help here.

The other major gap is for research and development projects. "The big problem area is between university research grants and start-up money," says David Cooksey of Advent. "This is where the British Technology Group and the Government should in my opinion concentrate its main efforts."

It is estimated that in the U.S. perhaps half the venture capital money goes to early stage ventures where it is used primarily for product development. In addition research and development partnerships, which offer attractive tax advantages, are widely used but in the UK they are virtually unknown.

A major task for the next British Government is therefore likely to be to divert funds to this important sector of the market.

Lombard

Why share prices matter

By Richard Lambert in New York

THREE CHEERS for the great bull market. At best, politicians tend to look on a steep rise in share prices as a mark of confidence in the wisdom of their policies—welcome, but not too relevant. At worst, they regard such an increase as a conspiracy by a handful of heartless speculators, who are profiting at the expense of the great mass of the public.

In reality, however, a bull market is capable of making a direct and significant contribution to the national well-being. The most obvious reason stems from the impact of a rise in share prices on the finances of individual citizens. It has been calculated that the value of consumer held stocks, bonds and liquid assets in the U.S. rose by more than \$600bn (\$221.5bn) in the 1980s had of 1982, thanks to the explosive performance of Wall Street.

Over time, this extra wealth will be translated into a measurable increase in consumer outlays. More significantly a bull market also increases both the willingness of companies to invest in new plant and equipment, and their ability to do so. During the 1970s, the price of just about everything rose steeply—except for equities. A share in AT and T was worth 120 packets of cigarettes in 1970—and just 81 packets in 1980.

As a result, the market value of U.S. corporations fell from well over 100 per cent of their net worth in the late 1960s to under 50 per cent in 1978. Now, however, the market value of U.S. corporations is back to where it was in 1960, and the market value of U.S. corporations is back to where it was in 1960.

So long as it is cheaper to acquire a factory by buying an existing business than by building on a greenfield site, takeovers flourished at the expense of new capital investment.

This paper shuffling has enriched some stockholders, but made little contribution to the overall economy. The bull market will make new investment even more attractive to companies and make it cheaper to accomplish. This is because in both the UK and the U.S.

equity is by far the biggest and most expensive component of the overall cost of capital.

A new study produced in the U.S. shows just how far the high cost of capital has handicapped American industry in the past decade: the message would apply just as strongly in the UK context.

In this analysis, the cost of equity is defined as the rate at which expected future dividends (as perceived by a company's managers) must be discounted in order to arrive at a present value equal to the stock market valuation of the company's shares. In other words, if a company wishes to issue equity to finance a project, it can't just work out the cost of the present dividend: it must also take into account the impact of dividend increases in the future.

Calculated in this way, the real cost of equity after tax in the U.S. jumped from around 6 per cent to 10 per cent as a result of the bear market of the mid-1970s.

During the past ten years, the analysis concludes that the cost of capital in the U.S. has been more than three times that prevailing in Japan—largely because debt financing makes up a much larger proportion of company balance sheets in Japan than in the U.S.

Whereas in 1981, a U.S. manufacturer would have spent \$6,700 for labour and \$3,300 for capital for a given amount of additional output, the study says that a Japanese manufacturer would have had to pay only \$3,900 and \$1,000 respectively for the same output.

The precise figure may be open to debate, but there is no escaping the sheer scale of Japan's capital cost advantage. Every point on the Dow makes the comparisons look less daunting—so let the bull market roll, and let's hear it for the FT 1000.

High cost of Capital: Handicap of American Industry. By Dr George Hatzopoulos. A study produced by the American Business Conference and Thermo Electron Corporation. Available from Thermo Electron, Attention: Ms Della Mitchell, 105 Bishopsgate, London, EC2.

Letters to the Editor

Points of international comparison on employment

From Mr M. Wolf

Sir,—It appears (May 17) that Mr Healey has argued that "Norway, Sweden, Austria and Japan had kept practically full employment right through the recession of the past 10 years by following the sort of policies proposed by Labour."

Mr Healey is perfectly correct that one or two points of comparison can be found between the policies followed by these countries and Labour's proposals (in part because Labour has so many proposals) although the differences between, for example, the anti-business policies and conservative attitudes to economic change of the Labour Party and the policies and attitudes of the

Japanese government are, I would have thought, more striking than the similarities. Mr Healey could, however, have pointed to more interesting comparisons, even among industrial countries, for example, to the expansionary fiscal policies of France under Mitterrand and of the U.S. under Mr Reagan, neither of which has yet proved to be an outstanding success.

Such single points of comparison are irrelevant. It is rather the combination of policies that matter, but on this comparison is more difficult. The Labour Party's proposals for protection (including import controls), nationalisation, expanded government consumption and investment expenditure, rising government borrowing, expansionary monetary policies and

extensive government control over private economic activity fortunately find no parallels, among major industrial countries, in the past 30 years.

For that combination one must turn to developing countries, where parallels are much easier to find. They include such economic disasters as Peron's Argentina, Allende's Chile, Manley's Jamaica, Ezevici's Turkey and Lopez Portillo's Mexico (and this is very far from an exhaustive list). It would be ironic if, promptly after the Falklands war, Britain were to follow the policies that started Argentina on the road to its present unhappy state.

Martin Wolf,
38, Peckham Road, SE26.

Steel demand and Ravenscraig

From the Director and Secretary, British Iron and Steel Consortium Council

Sir,—Dr Jeremy Bray asserts (May 18) that I present a scenario of savage deflation etc. being the result of what can be expected in terms of future steel demand. In fact I only pointed out that Cambridge Econometrics' highest forecast still left a margin of 5m tonnes excess capacity in the UK, roughly three times Ravenscraig's capacity. About half that excess would be in strip mills, which answers Dr Bray's assertion that I ignored the question of product mix. I also admit, after 15 years' experience of forecasting in the engineering industry, to a certain scepticism about politicians' forecasts based on assumptions of sharply increased future economic growth.

In a short letter there was also no space to deal with quality issues to which Dr Bray also refers. He is clearly unaware that for many years my council has pressed British Steel Corporation and the Government to maintain quality improving and cost reducing investment, e.g. in continuous casting. That is vital to BSC's competitiveness and that of its potential customers. We are assured that it is BSC's intention to maintain such investment, e.g. at the remaining strip mills. If BSC or taxpayers (through the Government) are unable or unwilling to afford this investment because the U.S. deal falls through and surplus capacity is retained at Ravenscraig at great cost, the consequences for competitiveness, and so jobs, in steel and the steel using industries will be serious indeed.

Dr Bray writes that BSC's strip mills "have now been asked to produce at their full capacity up to August." It is a pity that he did not make it clear that this referred to planned capacity which is only two-thirds of "plant capacity."

I will not repeat the arguments in favour of the U.S. deal (my letter of May 10). One of its advantages would be to make the jobs of more than half those currently employed at Ravenscraig, and some in Wales, no longer a burden on the taxpayer. The money saved could then be invested in infrastructure projects in areas particularly hard hit by unemployment, thereby creating more "real" jobs, not least in the steel and steel using industries.

J. F. Safford,
16, Berrym Road,
Richmond, Surrey.

Looking for staff

From the Managing Director, Securon (Amersham).

Sir,—As a relatively small company in Winchmore Hill, just between Amersham and High Wycombe, we employ at the moment some 100 people and are fortunate enough to have orders but find it very difficult to engage staff.

We use the Careers Office, which tells us there just aren't any about, we use the Job Centres, who tell us that the only people they have on their books are the ones who don't want to work, and in response to advertisements for secretaries, inspectors and the like, we get two or three applications.

We would point out that we are not looking for a bonus to employ people on the Youth Opportunities Scheme at £25 a week, but people working for us, providing they work reasonably hard, earn £20-£22 per week.

Dioxin and orders of toxicity

From Mr J. David

The hunt for the 41 barrels containing dioxin waste is an illustration of the political importance of dioxin. It is true that one-millionth of a gram of dioxin per kilogram of bodyweight would swiftly kill a human being, and nobody knows because dioxin has never yet killed anybody, it is still true that the 200 grams diluted to 2 tonnes has been diluted 10,000 times and this would give a fatal dose of 10 milli-

grammes per kilogram of bodyweight which is at least in the order of toxicity of many quite familiar substances.

The European chemical industry moves some 3m tonnes of dangerous and toxic waste across borders in Europe in the course of a normal working year and many times of times that quantity will be disposed of safely within national borders. The industry works consistently to improve its safety record but it can only do so on the basis of objective tests.

To add to all the problems generated by the political interest in dioxin has been the "Hooverisation" of the very name. In fact the very hazardous chemical generated at Seveso was a specific isomer of tetrachloro-p-benzodioxin. This is formed when certain asymmetric chlorinated phenols react. Virtually all phenols, however, are capable of forming dioxins and it must be one of the largest families of chemicals hitherto unrecorded simply because they only appear as impurities of phenols, many of which are important industrial raw materials.

If the term dioxin is extended beyond the specific isomer then products widely used in disinfectants, antiseptics, preservatives, adhesives and detergents, can all be said to contain dioxins. A ban on phenol based chemicals would be a backlash of imposing severity and immense economic effect. Similarly, if manufacturers of industrial chemicals are called upon to maintain standards of purity which have never been required for materials which might possibly contain TCDD, it is parts per billion, then the costs of manufacture of many of industry's basic materials

Nobody wants to lose

From Mr R. Musgrave

Sir,—According to your article on "Cometcon" multinationals (May 18) the latter do not think they should be likened to Western multinationals because the Eastern variety are guided by "state goals rather than private profit." This is misleading because the state's goal normally is to make a profit.

Of course the idealistic revolutionaries in Russia 50 years ago thought profit an undesirable objective. But nowadays most firms in Cometcon are expected to produce a return on capital just as in the West. Furthermore, countries desperately short of Western currency are hardly likely to set up operations in the West that aim to lose hard currency.

R. S. Musgrave,
24, Garden Avenue,
Framwellgate Moor, Durham.

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SECTION II - COMPANIES AND MARKETS

FINANCIAL TIMES

Monday May 23 1983

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EUROBONDS

How an innovative deal can fall flat

BY MARY ANN SIEGHART

THE EUROBOND market is proud of its tradition of innovation. Warrants, partly-paid deals, zero coupon bonds - these are just some of the ways the market keeps its head above water during uncertain times.

Sometimes, however, the product of hours and hours of imaginative investment bank thinking is given hardly a nod by the market. If a deal is too complex the market may grumble rather than cheer. Witness the case of last week's new deal for Crédit d'Équipement des Petites et Moyennes Entreprises (CEPME) an innovative issue which got only an average reception.

Hill Samuel's new idea for CEPME was a fixed-rate Eurosterling bond, which is convertible into a dollar floating rate note. The 12-year, £30m bond carries a coupon of 11% per cent at par. During the first five years of its life, it can be converted into a dollar FRN paying the six-month London interbank offered rate (Libor).

At first glance, it appears ingenious. And from CEPME's point of view, it is relatively cheap. Investors are sacrificing about 10 basis points on the straight bond and 40 basis points on the floater for the sake of the currency conversion option.

Hill Samuel conceived the bond as a hedge against a weaker pound should the Labour Party win Britain's general election. But it also found that the issue attracted interest from dollar-based floating rate note investors who receive nearly two extra percentage points of yield on the straight bond and can convert to floaters if sterling weakens.

At first, the market was mystified by the deal, but the price picked up from a two-point discount against its issue price of par to just over one by the end of the week. While investors were starting to bite, though, the middle men were less enthusiastic. "Where do I trade it?" asked one dealer. "Is it a dollar bond? A

sterling bond? Fixed-rate? Floating?"

Apart from trading difficulties, the bond is also difficult to value. One large fund manager explains: "If you're too innovative, you may frighten off some of the market who don't understand the deal. Even if you like it, it's not always easy to persuade your clients to buy it."

One new issue manager summed up the ambivalence many feel towards innovative deals: "What I would like to see is a plain vanilla straight bond correctly priced - that would be a real innovation in this market."

Elsewhere in the Eurodollar market, some \$345m worth of bonds was launched last week, almost all of it on Wednesday when the six-month Eurodollar deposit rate fell from 9% to 8% per cent. Short-term dollar rates were higher last week than they have been for about a month.

Deposit rates in D-Marks and Swiss Francs also rose last week, which might explain the lacklustre atmosphere in those markets.

The dollar secondary market, however, held up surprisingly well last week in view of the poor performance of the New York bond market. The larger-than-expected M1 money supply figures from the week before last showing an increase of \$42bn gave the New York market an attack of the jitters.

Prices in the Eurodollar market, though, fell only by about 1/4 point on the week. One reason may be that Europeans are less bearish about interest rates, but what is more likely is that Continental investors are taking a view on currency movements rather than interest rates, and the dollar has recently been strong.

This week is likely to be quiet in both the primary and secondary dollar markets.

HONG KONG MAY TAP EUROMARKETS

Politics and credit risk

BY PETER MONTAGNON IN HONG KONG

THE HONG KONG Government has been dropping tantalising hints to the foreign banking community that it may need to borrow next year to cover its budget deficit.

Last year the Government ran a budget deficit of HK\$3.5bn (US\$497m). This year, despite some sharp increases in indirect taxation, a further deficit of HK\$3.4bn is projected. The deficits will be met by drawing on reserves built up by years of accumulated surplus, but by the end of the current fiscal year in March 1984, net fiscal reserves would be down to only about HK\$8.8bn.

If the deficit continues into 1984, the government has indicated that it will resort to a "modest" amount of borrowing. No decision will, however, be made until later in the year when a clearer impression of this year's public accounts can be gleaned.

Nonetheless, the prospect of a rare borrower entering the Euro-

markets has already caused considerable speculation in Hong Kong especially in view of the political question mark hanging over the colony's future - the British lease on the New Territories expires in 1997.

The debate also shows up yet again the wide disparity in credit risk assessment between the bond markets and the Eurocredit market.

In normal times Hong Kong might be considered an excellent candidate for the bond market because of its established record as an exporter and its long tradition of prudent fiscal management. The intrusion of the political problem appears to put all that out of the question. "You couldn't sell Hong Kong to a dentist in Bruges," said one banker.

On the other hand the rarity of the name and the presence of many foreign banks in Hong Kong means that the colony could get away with a very low margin on the syndicated credit market, especially if its

borrowing was relatively short-term. Unlike dentists, bankers, it seems, would be only too glad to stand up and be counted in the case of Hong Kong.

They may not have to. Hong Kong could still decide that it does not need to borrow after all, or it may choose instead to borrow short-term Hong Kong dollars in the local money market. This will depend on whether its identified needs are foreign exchange costs or not - though one argument against local borrowing is that it could cause unwarranted upward pressure on Hong Kong interest rates.

Yet expectations in Hong Kong are such that there could even be a degree of disappointment among the foreign banking community if, having dropped the hint, Hong Kong decided not to borrow. "After all," says one interested banker, "nothing could do more to boost confidence in this place than a syndicated loan jointly led by the Hong Kong Bank and the Bank of China."

INTERNATIONAL CREDITS

Little progress on Brazil debt

BY MARGARET HUGHES IN LONDON

THE MAIN preoccupation of international bankers during the past week has been Brazil and Nigeria.

Efforts to resolve the Brazilian problem and, in particular, the restoration of \$1.5bn interbank lines, have been complicated by conflicting attitudes among leading Western central banks. While the U.S. Federal Reserve Board and the Bank of England have urged commercial banks to maintain interbank lines, several European central banks have been less insistent.

If there is no reversal of some commercial banks' refusal to restore interbank lines, the option of a new \$1.5bn commercial bank loan becomes increasingly likely, together with a possible approach to the U.S. Treasury.

Brazil is already some \$800m behind with its debt repayments and its liquidity crisis will be heightened by the possible delay of up to a month in the disbursement of the next tranche of the IMF's \$4.0bn loan. As a result, delayed repayment of the \$400m instalment of its

\$1.4bn BIS bridging loan due next month is also likely to be requested.

With the switch in venue from London to New York the Nigerian negotiations appear to have made progress, even if the situation has not been finally resolved. Broadening of short-term trade arrears seems both more realistic and more in keeping with Nigeria's needs.

Nigeria has succeeded in doubling the maturity of the refinancing loan to three years, even though this still remains tied to the letters of credit involved. But the possibility of new money, which the Nigerians have wanted all along, has been considerably increased by the decision of the banks to establish a co-ordinating committee and economic sub-committee which will look at Nigeria's overall debt situation. The banks concerned point out that it has yet to be established whether any rescheduling is needed.

Today is crucial for Chile since it is the deadline by which commercial

banks have to commit themselves to the package rescheduling \$3.4bn of debt which falls due this year, new loans of \$1.3bn and the restoration of some \$200m in short-term trade credits.

Although Argentina appears to have met its first-quarter IMF targets - the IMF board will be meeting this week - and so will be able to draw down the second tranche of its \$1.5bn IMF standby facility, it seems little nearer getting the proposed \$1.5bn medium-term loan from commercial banks.

The Central Bank has still to announce new terms for refinancing the \$4.8bn short-term private sector debt and the \$1.4bn in swaps.

Meanwhile, lawyers for the banks' co-ordinating committee have had little success in attempts to get the bankruptcy laws changed to alter the position of foreign bank creditors of Celulosa Argentina, whose \$150m foreign debts are at present subordinate to those owed to domestic banks.

CURRENT INTERNATIONAL BOND ISSUES

Borrowers	Amount m.	Maturity	Average life years	Coupon %	Price	Lead Manager	Offer yield %
U.S. DOLLARS							
U.S. Western Fin. Corp. \$	50	1988	15	7 1/2	100	CSFB	7.500
Hande Motor \$	100	1988	15	5 1/4	100	Wells Fargo, Houston Ind.	5.250
América \$	20	1988	16	-	100	Morgan Guaranty, Shearson/Amex	7.500
EMCA \$	20	1988	7	0	98 1/2	Rose Gendreau, Kurtz/Bungener	-
Sumitomo Bank \$	100	1990	7	10 1/4	99 1/2	Solomon Bros., Smith Barney Fin., Citicorp, Salomon Sachs	10.981
Credit Chimique \$	50	1988	7	5 1/4	100	Morgan Stanley	6.750
Finat \$	40	1988	5	6 1/4	100	CSFB, SBC	-
Santander \$	50-6	1995	12 1/2	5-5 1/2	100	UBS Secs	-
Mits. Bank of Denmark \$	80	1990	7	5 1/4	100	Nomura Secs.	-
D-MARKS							
SATS	100	1990	7	8 1/4	-	BHF-Bank	-
Rennett \$	150	1990	7	8	100	Deutsche Bank	8.900
Aussa \$	100	1988	5	8 1/4	100	Bay. Vereinsbank	8.250
Air Canada \$	100	1993	10	7 1/2	99 1/2	Deutsche Bank	7.448
Credit Foncier de France **	100	1991	8	8	100	Commerzbank	8.800
SWISS FRANCS							
Hande Motor \$	100	1988	-	3 1/2	100	UBS	3.500
Hande Motor \$ **	100	1988	-	3 1/2	100	UBS	3.500

* Not yet priced. † Final terms. ** Placement. † Floating rate note. ‡ Minimum. \$ Convertible. † With warrants. ‡ Includes FRN tranches. * Convertible into a dollar FRN. Note: Yields are calculated on ABRD basis.

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S.G. Warburg & Co. Ltd.

provided by

Amsterdam-Rotterdam Bank N.V.

Banca Commerciale Italiana
(London Branch)

Bank of Montreal

Banque Paribas (London)

The Mitsubishi Bank, Limited

S.G. Warburg & Co. Ltd.

Hambros Bank Limited

Swiss Bank Corporation

Commerzbank Aktiengesellschaft
London Branch

Société Générale Bank Limited

Banco di Sicilia

Banque Bruxelles Lambert S.A.
London Branch

May, 1983

All of these Securities have been sold. This announcement appears as a matter of record only.

U.S. \$200,000,000

GMAC Overseas Finance Corporation N.V.

10 1/2% Notes Due February 1, 1990

Payment of principal and interest unconditionally guaranteed by

General Motors Acceptance Corporation

MORGAN STANLEY INTERNATIONAL

ALGEMENE BANK NEDERLAND N.V.

AMRO INTERNATIONAL
LimitedBANK OF AMERICA INTERNATIONAL
Limited

BANK BRUSSEL LAMBERT N.V.

BANQUE GENERALE DU LUXEMBOURG S.A.

BANQUE NATIONALE DE PARIS

COMMERZBANK AKTIENGESELLSCHAFT

CONTINENTAL ILLINOIS CAPITAL MARKETS GROUP

CREDIT SUISSE FIRST BOSTON
Limited

DEUTSCHE BANK AKTIENGESELLSCHAFT

MANUFACTURERS HANOVER
Limited

MERRILL LYNCH INTERNATIONAL & CO.

NOMURA INTERNATIONAL
Limited

SALOMON BROTHERS INTERNATIONAL

SOCIETE GENERALE

SWISS BANK CORPORATION INTERNATIONAL LIMITED

UNION BANK OF SWITZERLAND (SECURITIES)
Limited

WOOD GUNDY LIMITED

May 9, 1983

This document includes particulars given in compliance with the Regulations of the Council of The Stock Exchange for the purpose of giving information to the public with regard to Channel Islands Transatlantic Investment Funds Limited ("CITIFUNDS" or the "Company"). The Directors have taken all reasonable care to ensure that the facts stated herein are true and accurate in all material respects and that there are no other material facts the omission of which would make a misleading statement, whether of fact or opinion. All the Directors accept responsibility accordingly.

Application has been made to the Council of The Stock Exchange for the Participating Shares of each class in the capital of the Company now being offered to be admitted to the Official List.

A copy of this Prospectus and of the Application Form, having attached thereto the documents specified below, have been delivered to the Registrar of Companies in London for registration.

CHANNEL ISLANDS TRANSATLANTIC INVESTMENT FUNDS LIMITED

A company incorporated with limited liability in Jersey as an investment company on 27th April, 1983 under the provisions of the Companies (Jersey) Law 1981 to 1983.

CITIFUNDS

MANAGED BY CITIBANK (CHANNEL ISLANDS) LIMITED

Initial offer for subscription of up to 60,000,000 Participating Redeemable Preference Shares of U.S.1 cent each ("Participating Shares") of the following classes and at the prices respectively specified, payable in full on applications:-

CLASS	PRICE PER PARTICIPATING SHARE	SHARE CAPITAL
Deutschemark Shares	DM 20	Issued and to be issued fully paid U.S.\$ 100
Japanese Yen Shares	¥ 2000	in Founders Shares of U.S.\$1 cent each
Sterling Shares	£ 5	in Unclassified Shares of U.S.1 cent each
Swiss Franc Shares	SFr 20	
United States Dollar Shares	U.S.\$10	
Managed Shares	U.S.\$10	

The Subscription Lists for this initial offer of Participating Shares will open at 9.00 a.m. (Jersey time) on Monday, 6th June, 1983 and will close at 10.00 a.m. (Jersey time) the same day.

Directors:
John Alfred Bennett,
Managing Director of Citibank (Channel Islands) Limited, Jersey,
Channel Islands.
John Chester Bore,
Managing Director of Citicorp International Bank Limited, London,
England.
Ronald David Corwin,
Managing Director of Fortinck S.A., Brussels, Belgium.
Jean-Pierre Cugni,
Chairman of Citicorp Bank Switzerland, Zurich, Switzerland.
Friedrich Wilhelm Menzel,
Managing Director of Citibank A.G., Frankfurt-am-Main,
Federal Republic of Germany.
Francisco Rudi,
Senior Vice President of Citibank, N.A. Paris, France.
Adolph John Zabick,
Senior Vice President of Citibank, N.A. London, England,
all c/o P.O. Box 104, St. Helier, Jersey, Channel Islands.
Registered Office:
Channel House, Green Street, St. Helier, Jersey, Channel Islands.
Managers, Registrars and Secretaries:
Citibank (Channel Islands) Limited, Channel House, Green Street,
St. Helier, Jersey, Channel Islands.
Investment Advisers:
Citibank, N.A., London branch, 336 Strand, London WC2R 1HB.
Citibank, N.A., Jersey branch, Channel House, Green Street,
St. Helier, Jersey, Channel Islands.
Lawyers:
Paul Marwick, Mitchell & Co., Chartered Accountants, Equity &
Law House, La Motte Street, St. Helier, Jersey, Channel Islands.
Stockbrokers:
M. Greenwell & Co., Bow Bells House, Broad Street,
London EC4M 9EL.
Legal Advisers:
In Jersey: Bedell & Crispin, Normandy House, St. Helier,
Jersey, Channel Islands.
In England: Coward Chance, Rye House, Aldermanbury Square,
London EC2Y 7LD.

CITIFUNDS:

The Company is an open-ended investment company incorporated in Jersey and by this Prospectus is offering up to 60,000,000 Participating Redeemable Preference Shares of U.S.1 cent each, which will be issued in registered form. Application has been made for the Participating Shares of each class to be admitted to listing on The Stock Exchange in London.

Currency Funds:

Investors will be able to invest in any one or more of the following five currencies:

Deutschemark
Japanese Yen
Sterling
Swiss Franc
United States Dollar

Each currency will have its own Currency Fund and an investment in the Currency Fund selected by the investor will take the form of an investment in Participating Shares of the class related to that Currency Fund.

Each Currency Fund is to be managed entirely separately and independently from every other Currency Fund. The minimum subscription to the Currency Funds is:-

DM 10,000	¥1250,000
£3,000	SFr 10,000

Managed Fund:

Separately from the five Currency Funds, investors may invest in Participating Shares in the Managed Fund in which the Managers select on a discretionary basis the currency or currencies in which investments are denominated. Investors should be aware that the value of the Participating Shares in the Managed Fund may fall as well as rise.

Participating Shares of the Managed Fund will be denominated in U.S.

SUMMARY

This summary is qualified in its entirety by the fuller particulars set out below to which reference should be made.

The minimum initial subscription in the Managed Fund is U.S.\$5,000.

Objectives:

CITIFUNDS will provide a professionally managed investment in the currency or currencies of the investor's choice, yielding a money market rate of return combined with low risk, ready availability of funds and the ability to switch between each Fund.

Investment Policy:

Each Fund will be managed within prudent and conservative guidelines as to the liquidity and quality of the investments held. Investments of the Currency Funds will be made and maintained so as to avoid foreign exchange risk.

Allocation and Redemption of Shares:

Participating Shares may be applied for on any Dealing Day and, subject to two days' prior notice, may be redeemed on any Dealing Day. Settlement will normally take place two business days after the relevant Dealing Day.

Conversion of Shares:

Shareholders can elect to switch all or part of their investment in one Fund to an investment in another Fund by converting their holding of Participating Shares of one class into Participating Shares of another class.

Special Arrangements:

Investors, particularly those with substantial funds at disposal, may prefer to take advantage of a simplified procedure under which they elect to have their Participating Shares registered in the name of the Custodian, who will on their behalf hold the share certificate(s) and execute the investor's teleaxed instructions as to conversion and/or redemption. The required procedure on subscription is set out in Application Procedure below. Arrangements as to conversion and redemption can be obtained by direct

application to the Custodian. Telephone Jersey (0534) 70334 and Telex 4192436.

Share Prices and Valuations:

Participating Shares have a nominal value of U.S.1 cent each. Following this initial issue, which is at the subscription prices specified above, each class of Participating Shares will be valued by reference to the underlying net asset value of the relevant Fund. In normal circumstances, the subscription and redemption prices of Participating Shares of a Fund on any Dealing Day will be the same.

No dividends will be payable on the Participating Shares. All income will be accumulated in the appropriate Fund and share prices will be calculated to reflect each day's accrued income.

The share prices for each Fund will be published daily in the London edition of the Financial Times and can be obtained during business hours by reference to the Managers.

Charges:

No charges will be made by the Company to an investor on subscription for, or redemption of, or conversion into Participating Shares in the Currency Funds. Subscriptions for or conversions into Participating Shares in the Managed Fund of less than U.S. \$10,000 will be subject to an initial charge of 2½% of the amount invested.

Fees:

The Managers and the Custodian will receive monthly for their services to the Currency Funds a fee at the rate of ¾ per cent. per annum and ½ per cent. per annum respectively calculated on the average daily net asset value of each Currency Fund.

The Managers and the Custodian will receive monthly for their services to the Managed Fund a fee at the rate of 1¼ per cent. per annum and ¾ per cent. per annum respectively calculated on the average daily net asset value of the Managed Fund.

No person receiving in any territory (other than the United Kingdom) a copy of this Prospectus and/or Application Form may use the same as constituting an invitation or offer to him nor should he in any event use such Application Form unless he is the relevant territory such an invitation or offer could lawfully be made to him without compliance with any requirements or other legal requirements. It is the responsibility of any person outside the United Kingdom wishing to take up any investment or to make an application hereunder to satisfy himself as to full observance of the laws of the relevant territory in connection therewith, including the obtaining of any government or other consents which may be required, the satisfaction of any other formalities needing to be observed and the payment of any issue, transfer or other taxes required to be paid in such territory.

No person has been authorised to give any information or to make any representations (other than those contained in this Prospectus) in connection with the issue and sale of the Participating Shares and, if given or made, such information or representations must not be relied upon as having been authorised by the Company. Neither the delivery of this Prospectus nor any issue or sale made hereunder shall, under any circumstances, create any implication that there has been no change in the effect of the Company since the date hereof.

The Participating Shares have not been registered under the United States Securities Act of 1933 and, except in a transaction which does not violate the United States securities laws, may not be directly or indirectly offered or sold in the United States of America (including its possessions, its territories and all areas subject to its jurisdiction) or to or for the benefit of any persons (being natural persons, citizens or residents thereof or corporations organised under the laws of the United States of America) or to others purchasing the Participating Shares for re-offering, resale or delivery, directly or indirectly, in the United States, or to or for the benefit of any such persons.

Prospective shareholders should be aware that the Participating Shares do not represent a direct obligation of Citibank, N.A. or of their respective branches or subsidiaries.

The contents of the Prospectus and the Application Form are not intended to constitute an offer of securities in any jurisdiction. The Financial and Economics Committee takes no responsibility for the financial soundness of any schemes or for the correctness of any of the statements made or opinions expressed with regard to them.

All references herein to: (i) "U.S." are to the currency of the United Kingdom; (ii) "U.S." and "U.S. Dollars" are to the currency of the United States of America; (iii) "U.S." and "Yen" are to the currency of Japan; (iv) "Sfr." and "Swiss Franc" are to the currency of Switzerland; and (v) "DM" and "Deutschemark" are to the currency of the Federal Republic of Germany.

"Dealing Day" means any day that is a business day in Jersey; "Settlement Day" means the day for settlement of the relevant transaction in accordance with Eurocurrency market practice and will normally be two business days after the relevant Dealing Day; and "Funds" means the Currency Funds and the Managed Fund.

For all purposes of this Prospectus, a business day in Jersey shall be deemed to run from 10.00 a.m. (Jersey time) on the one business day until 10.00 a.m. (Jersey time) on the immediately succeeding business day.

CITIFUNDS: The Company was incorporated in Jersey on 27th April, 1983 with limited liability in Jersey and is authorised to issue up to 60,000,000 Participating Redeemable Preference Shares of U.S.1 cent each, which will be issued in registered form. Application has been made for the Participating Shares of each class to be admitted to listing on The Stock Exchange in London.

The Company will have and redeem Participating Shares designated in the currency of each Fund. The Company is authorised to issue up to 60,000,000 Participating Shares, which will be issued in registered form. Application has been made for the Participating Shares of each class to be admitted to listing on The Stock Exchange in London.

Each Fund will be managed within prudent and conservative guidelines as to the liquidity and quality of the investments held. Investments of the Currency Funds will be made and maintained so as to avoid foreign exchange risk.

Participating Shares may be applied for on any Dealing Day and, subject to two days' prior notice, may be redeemed on any Dealing Day. Settlement will normally take place two business days after the relevant Dealing Day.

Shareholders can elect to switch all or part of their investment in one Fund to an investment in another Fund by converting their holding of Participating Shares of one class into Participating Shares of another class.

Investors, particularly those with substantial funds at disposal, may prefer to take advantage of a simplified procedure under which they elect to have their Participating Shares registered in the name of the Custodian, who will on their behalf hold the share certificate(s) and execute the investor's teleaxed instructions as to conversion and/or redemption. The required procedure on subscription is set out in Application Procedure below. Arrangements as to conversion and redemption can be obtained by direct

application to the Custodian. Telephone Jersey (0534) 70334 and Telex 4192436.

Participating Shares have a nominal value of U.S.1 cent each. Following this initial issue, which is at the subscription prices specified above, each class of Participating Shares will be valued by reference to the underlying net asset value of the relevant Fund. In normal circumstances, the subscription and redemption prices of Participating Shares of a Fund on any Dealing Day will be the same.

No dividends will be payable on the Participating Shares. All income will be accumulated in the appropriate Fund and share prices will be calculated to reflect each day's accrued income.

The share prices for each Fund will be published daily in the London edition of the Financial Times and can be obtained during business hours by reference to the Managers.

No charges will be made by the Company to an investor on subscription for, or redemption of, or conversion into Participating Shares in the Currency Funds. Subscriptions for or conversions into Participating Shares in the Managed Fund of less than U.S. \$10,000 will be subject to an initial charge of 2½% of the amount invested.

The Managers and the Custodian will receive monthly for their services to the Currency Funds a fee at the rate of ¾ per cent. per annum and ½ per cent. per annum respectively calculated on the average daily net asset value of each Currency Fund.

The Managers and the Custodian will receive monthly for their services to the Managed Fund a fee at the rate of 1¼ per cent. per annum and ¾ per cent. per annum respectively calculated on the average daily net asset value of the Managed Fund.

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The Participating Shares have not been registered under the United States Securities Act of 1933 and, except in a transaction which does not violate the United States securities laws, may not be directly or indirectly offered or sold in the United States of America (including its possessions, its territories and all areas subject to its jurisdiction) or to or for the benefit of any persons (being natural persons, citizens or residents thereof or corporations organised under the laws of the United States of America) or to others purchasing the Participating Shares for re-offering, resale or delivery, directly or indirectly, in the United States, or to or for the benefit of any such persons.

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The Company will have and redeem Participating Shares designated in the currency of each Fund. The Company is authorised to issue up to 60,000,000 Participating Shares, which will be issued in registered form. Application has been made for the Participating Shares of each class to be admitted to listing on The Stock Exchange in London.

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Each Fund will be managed within prudent and conservative guidelines as to the liquidity and quality of the investments held. Investments of the Currency Funds will be made and maintained so as to avoid foreign exchange risk.

Scottish Provident chief

manager (personnel) for West
of Scotland TSB.

★

BRABY		ECONOMIC
APPLIANCES	has	appointed

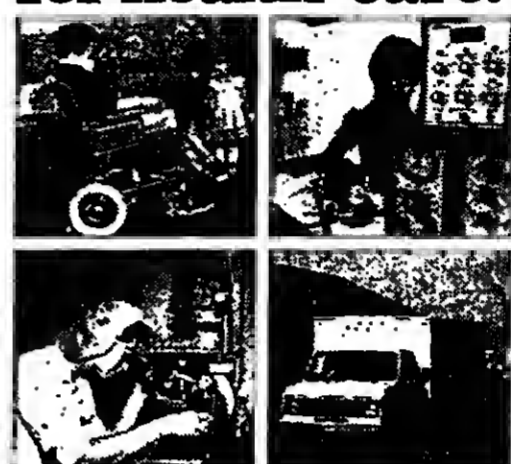
SAMUEL MONTAGU AND CO
has appointed Mr David Dale an
assistant director.

This advertisement is published by Thomas Tilling plc, whose directors (including those who have delegated detailed supervision of this advertisement) have taken all reasonable care to ensure that the facts stated and opinions expressed herein are fair and accurate and each of the directors accepts responsibility accordingly.

InterMed is Thomas Tilling

One of a series

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The international group
with many names
for health-care.



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Bomford England Hunger England
Bosmer Dorset USA Indiana England
Kellie Scotland Specter England
Venn England & France Switzerland Austria & Germany

Laboratory
Laboserv Sweden Nippon Intermid Japan
Nunc Denmark & Germany Targem Denmark

Hospital Equipment
Beaer Medical Systems USA & Switzerland
Cape Warwick England Dusa & Halyer England
La Mission des Medecin France
Microform Pathfinder England Penlon England & USA

Distribution
Intermedica USA Snelow USA



World-wide headquarters: InterMed Limited InterMed House, Rushmore Ave Windsor, Berkshire SL4 1PP England
Telephone: Windsor (075) 353 57632

InterMed is an international group of health care companies, specialising in the manufacture and supply of a wide range of medical, dental, laboratory, veterinary and rehabilitation products.

Thomas Tilling



The sum of our parts makes us strong

Builders' Merchants, Construction Materials and Services, Electronic Equipment and Supplies,
Energy Equipment, Health Care, Electrical Equipment Distribution, Insurance, Manufacturing Engineering,
Furniture, Publishing, Textiles, Tiles and Pottery, Japan Trading.

**The Managing Director
Intimis Management Company N.V.**

Closing prices May 20

NEW YORK STOCK EXCHANGE COMPOSITE CLOSING PRICES

[illegible]

Continued on Page 2

AMERICAN STOCK EXCHANGE COMPOSITE CLOSING PRICES

[illegible]

Continued on Page 2

NEW YORK STOCK EXCHANGE COMPOSITE CLOSING PRICES

Continued from Page 26									
12 Month	High	Low	Stock	Div.	Yld.	P/E	Stk.	High	Low
174	44	40	Indust	12.8	12	12	428	42	40
175	44	40	Indust	12.8	12	12	428	42	40
176	44	40	Indust	12.8	12	12	428	42	40
177	44	40	Indust	12.8	12	12	428	42	40
178	44	40	Indust	12.8	12	12	428	42	40
179	44	40	Indust	12.8	12	12	428	42	40
180	44	40	Indust	12.8	12	12	428	42	40
181	44	40	Indust	12.8	12	12	428	42	40
182	44	40	Indust	12.8	12	12	428	42	40
183	44	40	Indust	12.8	12	12	428	42	40
184	44	40	Indust	12.8	12	12	428	42	40
185	44	40	Indust	12.8	12	12	428	42	40
186	44	40	Indust	12.8	12	12	428	42	40
187	44	40	Indust	12.8	12	12	428	42	40
188	44	40	Indust	12.8	12	12	428	42	40
189	44	40	Indust	12.8	12	12	428	42	40
190	44	40	Indust	12.8	12	12	428	42	40
191	44	40	Indust	12.8	12	12	428	42	40
192	44	40	Indust	12.8	12	12	428	42	40
193	44	40	Indust	12.8	12	12	428	42	40
194	44	40	Indust	12.8	12	12	428	42	40
195	44	40	Indust	12.8	12	12	428	42	40
196	44	40	Indust	12.8	12	12	428	42	40
197	44	40	Indust	12.8	12	12	428	42	40
198	44	40	Indust	12.8	12	12	428	42	40
199	44	40	Indust	12.8	12	12	428	42	40
200	44	40	Indust	12.8	12	12	428	42	40
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204	44	40	Indust	12.8	12	12	428	42	40
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206	44	40	Indust	12.8	12	12	428	42	40
207	44	40	Indust	12.8	12	12	428	42	40
208	44	40	Indust	12.8	12	12	428	42	40
209	44	40	Indust	12.8	12	12	428	42	40
210	44	40	Indust	12.8	12	12	428	42	40
211	44	40	Indust	12.8	12	12	428	42	40
212	44	40	Indust	12.8	12	12	428	42	40
213	44	40	Indust	12.8	12	12	428	42	40
214	44	40	Indust	12.8	12	12	428	42	40
215	44	40	Indust	12.8	12	12	428	42	40
216	44	40	Indust	12.8	12	12	428	42	40
217	44	40	Indust	12.8	12	12	428	42	40
218	44	40	Indust	12.8	12	12	428	42	40
219	44	40	Indust	12.8	12	12	428	42	40
220	44	40	Indust	12.8	12	12	428	42	40
221	44	40	Indust	12.8	12	12	428	42	40
222	44	40	Indust	12.8	12	12			

Continued on Page 28

Sales figures are unaudited. Yearly highs and lows reflect the previous 52 weeks plus the current week, but not the latest trading day. Where a split or stock dividend amounting to 25% or more has occurred since the date of the last dividend, the dividends shown are for the new stock only. Unless otherwise noted, rates of dividends are annual disbursements based on the latest declaration:

a—dividend also extra(s) b—annual rate of dividend plus
c—dividend declared and paid in preceding 12 months; g—
dividend declared or paid in preceding 12 months; g—
declared in Canadian funds, subject to 90% non-residence tax;
h—dividend applied to stock account; i—dividend
paid this year, omitted or deferred; j—dividend
not meeting; k—dividend declared or paid this year, an accumulative issue with dividends in arrears; n—new issue in the
current year; o—dividend begins with the new year of trading;
nd—next day delivery; P/E—price-earnings ratio; r—dividend
declared or paid in preceding 12 months; plus stock dividend;
s—stock dividend declared or paid in preceding 12 months;
t—dividend paid in stock in preceding 12 months; estimated cash
value on ex-dividend or ex-distribution date; u—yearly high;
v—yearly low; w—dividend received by membership or being re-
organized under the Bankruptcy Act; x—dividend issued to such companies, wd—when distributed, w—in which issued, wv—with warrants; y—ex-dividend or ex-rights; z—ex-distribution,
rights, warrants; y—ex-dividend and sales in full, yd—paid in
z-sales in full.

Indices

DOW JONES

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NEW YORK CLOSING PRICES

12 Month	High	Low	Stock	Div. Yld.	Ft. E	100s High	Low	Open	Prat.	Quot.	Close
48	2 1/4		Westp	8.43 10	270	493	44	40%	-		566
128	9		Westp	gt.58	121	115	114				771
128	9		Westp		121	115	114				1,908
128	9		Westp		121	115	114				1,408
128	9		Westp		121	115	114				1,250
128	9		Westp		121	115	114				880
128	9		Westp		121	115	114				450
71 1/2	5 1/4		WPA	pt. 12	3	819	78	74	+		566
71 1/2	5 1/4		WPA	pt. 12	3	819	78	74	+		771
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71 1/2	5 1/4		WPA	pt. 12	3	819	78	74	+		1,408
71 1/2	5 1/4		WPA	pt. 12	3	819	78	74	+		1,250

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FINANCIAL TIMES

FINANCIAL TIMES

BRITAIN'S BUSINESS CENTRES

FINANCIAL TIMES SPECIAL REPORT

Aberdeen

Bright prospects for the Granite City

ABERDEEN has never had it so good—and it looks as though the ancient granite city is about to have it even better.

The development of offshore oil fields over the last decades has brought a vast and highly technical industry to this city which had a relatively modest past in fishing, textile, paper and engineering.

The city today exudes a prosperity unlike any other in Scotland, based on an industry paying above average wages and now accounting for about 40,000 jobs.

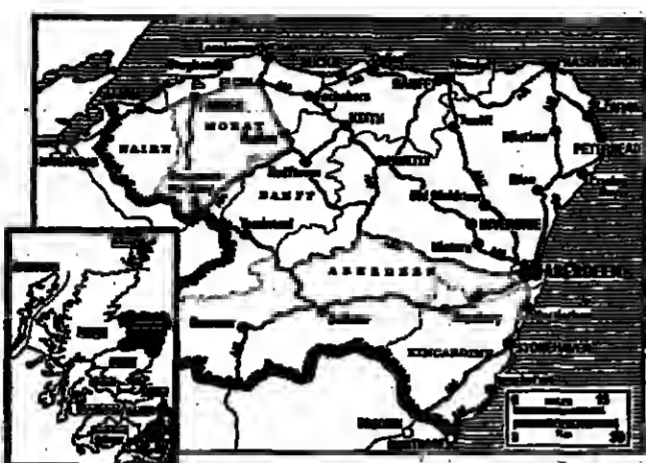
Aberdeen has traditionally had low unemployment and presently this remains around the 7 per cent mark, compared with the 15.1 per cent in industrial blackspots such as the Irvine area of the south-west.

The major oil corporations and their attendant array of companies feeding them services and equipment have had a dramatic effect on all areas of the city economy.

It seems that the crowds on Union Street, the main shopping area, show a similarity to London's Oxford Street during the sales.

The airport can give the visitor the first real feel of excitement for this new industry as squadrons of helicopters queue up in the early morning to take crews out to the offshore installations. The harbour thrives with supply boats, fishing vessels or ferries serving Orkney and Shetland.

In this city, international oil market and production forecasts are read as farmers might scrutinise the weather report. Fluctuations in the international fortunes of oil can influence new building decisions, a move by a new company seeking to a



With the forecast of decades of offshore oil operations in the North Sea, the future of Aberdeen looks increasingly promising. This confidence is highlighted by plans for an international trade centre in the city to sell products and services to the world's offshore operators.

REPORT BY MARK MEREDITH
PICTURES: ROGER TAYLOR

break into a highly competitive market, or a construction company's building programme for local housing.

While the boom-type growth of the 1970s may be over, industrialists in Aberdeen are confident there are decades of offshore operations ahead, as well as continued new explorations and the exploitation of marginal fields—all promising news for a city now very much

dependent on oil and gas.

The budget proposals on oil has brought new encouragement for the offshore industry. The Chancellor's message relieved a number of grievances by oilmen and should spur new interest after a slack winter with little new activity.

The measure granted immediate relief against petroleum revenue tax for expenditure and appraisal activities, a doubling

of oil allowances for future fields, an abolition of royalties on fields granted Government approval after April 1, 1982, progressive phasing out of the petroleum revenue tax in the period up to 1986 and tax relief on shared assets, such as pipelines.

These measures are expected to generate new moves into marginal oil fields off the Shetland Islands and in the deeper waters of the North Atlantic where a whole new generation of production technology will be needed.

But the lead times between the discovery of oil in a new field and new orders for equipment to bring it up commercially can take months or even years.

In the meantime support services for the 20 offshore fields presently in production and others in early development continues to provide business for Aberdeen.

In the coming year, the city will see a fundamental development in the history of the offshore industry. Leading figures from the private sector have proposed the construction of a trade centre in the city to act as a market place for British companies trying to sell products and services to international offshore operators.

The significance of the centre is that it is aimed at correcting an imbalance of UK to foreign groups, which are active offshore. The North Sea required the know-how and resources of the American oilmen. But, to date, there are many areas of technology and service where British companies have yet to make their mark.

The trade centre would operate on a commercial basis, offering consultancy services, such as marketing advice to help new companies penetrate a difficult market—one where mistakes and lost time cost hundreds of



Aberdeen harbour, thronged with supply boats, fishing vessels and ferries serving Orkney and Shetland. Aberdeen is lobbying vigorously for "free port" status which would provide a further stimulus for the oil industry

thousands of pounds.

According to estimates in a joint study by the Scottish Development Agency (SDA) and the North East of Scotland Development Authority (NESDA) which is part of Grampian Regional Council, spending offshore this year on exploration, development and operations will be around £3.5bn, rising to over £5bn in 1986.

According to current estimates from the Government's Offshore Supplies Office, 73 per cent of the contracts for the £2.6bn spent by the offshore operators in 1982 went to British companies. But this figure includes UK subsidiaries of American companies, many of them based in Aberdeen.

Another important development in the coming year could be the Government decision on a free port. Aberdeen has lobbied vigorously for the nomination feeling it would provide yet further stimulus for the oil industry.

According to backers of the free port concept, part of the freeport could be around Dyce Airport and the rest near the harbour to cater for the different types and size of offshore exported equipment.

The Scottish Development Agency has plans to develop a science park joined to the University of Aberdeen which

could supply a new focal point for high technology industries with offshore applications. For a city in the midst of Britain's largest industrial revenue maker, the city of Aberdeen has been easy to neglect in terms of the attentions of development bodies.

Industrial decline has blighted much of Scotland, calling on the full resources of bodies such as the Scottish Development Agency, which has a low profile in Aberdeen.

But the traditional industries

of this city such as textiles, fish processing, paper and engineering have been severely damaged during the build up of offshore interest.

These manufacturing industries have declined at a rate similar to that of Strathclyde in the heavily industrialised west of Scotland.

A oil and non-oil economy has been created leading the region to resist strongly the Government decision to remove assisted area status for most of Grampian and hence remove grants and other benefits to in-

coming industries in the manufacturing sector.

New inward investment in non-oil industries is now unlikely. But a development study for the city recommended greater attention on industrial diversification, especially in the area of microelectronics which has good potential applications to offshore work.

Aberdeen throughout this past decade has kept its grey granite character and the centre of town has not been totally overtaken by new developments. The offices and the industrial estates cluster like satellites around the periphery of the city.

Aberdeen lacks the layer of industrial soot of big cities reflecting the modest size of its traditional industries.

In the field of office and commercial property, the day is past when the oil majors will gobble up huge chunks of space and more smaller units are in demand. The four-year supply of space now available is a worry to property men.

New operators may, however, appear on the scene with future rounds of licences and they will require headquarters and staff. They will also buy at the local shops, fly from the airport and add further to the prosperity of a small and ancient city which now enjoys a relative economic "high."



Support services for 20 offshore oil fields provide big business for Aberdeen

Institutions which have pre-funded or purchased our developments in Aberdeen include —

- Confederation Life Insurance Company
- Electricity Supply Nominees (Scotland) Ltd
- National Farmers Union Mutual Insurance Society Ltd
- Pearl Assurance (Unit Funds) Ltd
- RMC Pension Trust Ltd
- The Royal National Pension Fund for Nurses
- Strathclyde Regional Council Superannuation Fund

The Company was founded in 1863 and since its move into the property development and industrial field in the mid 1970's Mountleigh has acquired a reputation for excellence in design and quality of construction. The Group is also currently developing in London, Glasgow and West Yorkshire.

Mountleigh has recently leased its three residential Estates in Suffolk to the United States of America for occupation by USAF personnel at an annual rent in excess of £2m.

Five year financial record

	1982	1981	1980	1979	1978
	£'000	£'000	£'000	£'000	£'000
After tax profits	647	378	453	347	152
Earnings per share (pence)	16.15	9.42	11.30	8.64	3.78
Dividends per share (pence)	4.00	3.50	3.00	1.44	1.29
Assets per share (pence)	172.05	142.75	83.55	63.98	56.60

Tenants of our Aberdeen projects include —

- The Royal Bank of Scotland
- Hambro Life Assurance
- Oceanengineering International Services Ltd
- Ind Coope
- Lunn Poly

Aberdeen



Mountleigh GROUP plc

Leigh House
Stanningley, Pudsey,
West Yorkshire, LS28 7XG

Telephone: (0532) 578254. Telex: 557905

Mountleigh developments to let in Aberdeen through —

PAUL GEE & Co
78 QUEENS ROAD
ABERDEEN AB1 6YE
(0224) 325385
TELEX 739340

INDUSTRIAL WITH OFFICES

Altens : Minto Drive

- 25,000 sq ft industrial with linked 7,500 sq ft office building.
- 1 acre concrete storage yard.
- prominently situated on Aberdeen's foremost industrial Estate.
- built to the very highest specification.
- available now.

Joint Agents — Richard Ellis, Glasgow

City Centre : Miller Street

- adjacent to harbour and inner ring road.
- 9 units totalling 70,000 sq ft of which 45,000 sq ft already let.
- units available 3,000 sq ft, 5,000 sq ft and 9,000 sq ft.
- available summer 1983.

Altens : Blackness Industrial Centre

- units sizes from 2,500sq ft with secured storage yards.
- short or long leases.
- available June.

Joint Agents — F G Burnett, Aberdeen

Dyce : Airways Estate (Phase II) : Pitmedden Road

- units from 2,000 sq ft with secured storage yards.
- immediately adjacent to Aberdeen Airport.
- short or long leases.
- just completed.

Joint Agents — F G Burnett, Aberdeen

OFFICES

West End : 7/8 Rubislaw Terrace

- 2 adjoining properties in Aberdeen's very best office location.
- refurbished to the highest Mountleigh's standards.
- mix of individual and open plan offices.
- exclusive car parking.

- each building 3,600 sq ft.
- available now separately or together.

City Centre : Chapel Street

- 35,000 sq ft office development within yards of Union Street.
- parking for 50 cars.
- available mid 1984.

Joint Agents — Richard Ellis, Glasgow

LAND

Mountleigh has prime land available and can provide accommodation to meet any requirement.

ABERDEEN II

FINANCIAL TIMES REPORT

New projects in marginal oilfields will boost Aberdeen's oil-dominated economy

44,000 oil workers now based in the region

OIL has taken over the Aberdeen economy. An estimated 44,000 workers in the Grampian region are in oil-related employment, 95 per cent of whom are based in Aberdeen. The city itself is small with a population of 212,000.

The very strength of the oil economy has to a certain extent formed a dual economy with a lower category of wages costs and for the traditional non-oil industries.

Aberdeen watches key national and international factors affecting oil production as a weathervane to the city economy. Official surveys of the economy for the surrounding region usually

include a review of forecasts for further oil development. The Government's tax structure and low oil prices have made this a comparatively cold winter for Aberdeen, although many other cities in Scotland and the rest of the UK would dearly welcome an economic climate such as this.

Uncertainty

But reduction of offshore work quickly spreads onshore. Supply boats wait for new contracts tied up in the harbour. House prices move uncertainly.

The budget stimulus to oil is seen as opening a new era

of development with new drilling and exploration in marginal fields and a host of eagerly awaited service contracts.

The Quarterly Economic Journal of the Grampian region, which surrounds Aberdeen, points out other benefits for the economy in enhanced consumer demand from the raising of personal tax thresholds.

However, vigorous the stimulus from the Government, downstream industries remain aware of the long lead times involved before contracts percolate down from the offshore operators.

A year or more can lapse from the time an oil company starts to drill to the time it decides to develop a field for full production.

But in the background of planners and the Government is the multiplier effect the offshore industry has — one job offshore means about two jobs onshore.

Training

In 1982, the oil majors employed nearly 9,000 people in Grampian and according to interviews conducted with the companies in the region's department of physical plan-

ning, employment in 1988 could rise to 10,970 and by 1991 to 13,280.

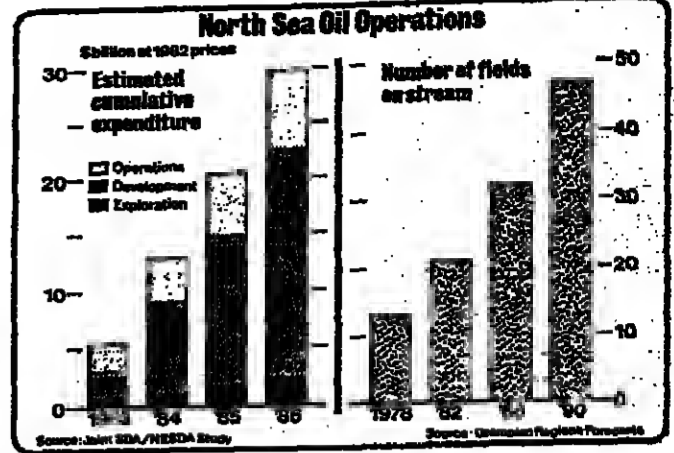
In March, the Manpower Services Commission published an in-depth study of the manpower needs in the region and noted that skill shortages had eased although demand would grow over the next five years.

The report urged a greater attention to training for specialist and technician skills if shortages are to be avoided in future.

The report forecast that employment of craftsmen and technicians would expand at twice the rate of total

employment. Occupations such as electrical and electronic technicians, instrument technicians, and instrument mechanics are much in demand and nearly 30 per cent of the companies interviewed by the Manpower Services Commission anticipate trouble in recruiting.

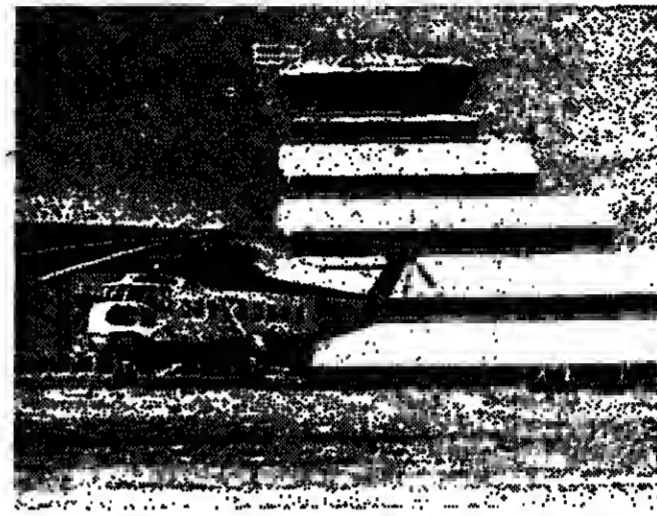
A feature of the growth decade for North Sea oil has been the increase in British personnel in all aspects of onshore and offshore work and there should be no shortage of personnel to carry out the most sophisticated work, according to Aberdeen industrialists.



INVESTMENT IN THE OIL INDUSTRY

Estimates (in \$bn at 1982 prices) by the Scottish Development Agency and the North-East Scotland Development Authority of investment in oil-related activities

	1983	1984	1985	1986
Exploration:				
Surveying	0.045	0.063	0.065	0.077
Exploration appraisal	0.634	0.563	0.546	0.528
Development:				
Production platforms	1.353	2.987	2.593	3.639
Installation gas	0.324	0.102	0.290	0.446
Plant and equipment	0.161	0.759	0.607	0.508
Submarine pipelines	0.041	—	—	—
Development drilling	0.399	0.308	0.317	0.353
Terminals	0.822	1.08	1.272	1.332
Operating:				
Maintenance	0.290	0.299	0.310	0.341
Transport	0.576	0.588	0.607	0.674
Diving services	0.174	0.178	0.183	0.204
Drilling services	0.387	0.398	0.408	0.432
Offshore support	0.185	0.176	0.185	0.222
Miscellaneous	0.213	0.220	0.225	0.250
Totals	5.494	7.733	7.287	8.426



The mix of helicopters and planes is not an easy situation for Aberdeen Airport—the third busiest airport in Britain, in terms of air transport movements. Above: A British Airways helicopter being prepared for a flight out to offshore oil installations.

Traffic soars at the world's largest heliport

THE TIME: 7 am. The place: Aberdeen Airport, where a scene in the drama of North Sea oil development is beginning to unfold.

On the tarmac are ten or more helicopters, their rotor blades whirling as permission is awaited to fly-out crews to offshore oil platforms, exploration rigs or drilling sites. The helicopters, for safety reasons, hover at the end of the runway and then move down the length of the tarmac as they gain height. It is a procession in case of engine failure.

For an hour the airport is dominated by the helicopters—not the high pitched whine of jet engines, but the furious thrash of rotor blades.

This is, in fact, the world's largest heliport—a place where visitors quickly sense the daily excitement of the offshore oil industry and the air services that back it all up.

The mix of helicopters and yet planes is not an easy situation for a busy airport—the third busiest in Britain, in terms of air transport movements. It is an extra load on air traffic controllers who co-ordinate landings between aircraft landing at the near walking

pace of a helicopter to the speed of jets.

Helicopter traffic in March was up by more than 50 per cent compared with the same time last year. Much of this has been due to the replacement of fixed-wing aircraft by long range helicopters to reach distant fields. Previously, fixed-wing aircraft carried crews to Sumburgh Airport at the southern tip of the Shetland Islands where helicopters would then take them to offshore oil rigs.

Long range helicopters, such as the Chinooks, Sikorsky S70s and Super Pumas can now make the trip from Aberdeen.

Traffic level

Helicopter passenger traffic has reached over 400,000 a year as part of the 1.6m passing through the airport.

Mr Vernon Murphy, the general manager of the airport, points to the peculiarities of Dyce airport at Aberdeen. It serves a very small catchment area of around 350,000 to 400,000 people, a fraction compared to the millions within the reach of Heathrow or Gatwick. This means that most of the passengers flying in to Aber-

deen live elsewhere.

The airport is the busy hub of the North Sea air communications for five days a week. Then, over the weekend, all goes quiet and it again becomes the regional airport serving a small city.

London is still a prime destination for passengers. British Airways have a Tristar, the first wide-bodied jet to use the airport, to cope with some of the pressure on flights.

Dan-Air and the smaller commuter services within Scotland and the British Isles, such as Air Ecosse, Loganair, and Air UK use the airport as well as a host of companies

on charter business.

Mr Murphy also points to an increase in holiday traffic out of the airport—a nearly 30 per cent rise over the year from seven to 11 flights per week. Most of these are package holiday flights to Spain.

Despite an active programme of improvements such as radar assisted landing facilities on the main 6,000 foot runway and adjacent helicopter strip, there is still some feeling that things could improve.

Access to the airport by road from the city is very poor with 30-minute journeys not uncommon through dense traffic.



Shortages of skilled labour in Grampian have eased, although demand will grow during the next five years, according to a recent survey by the Manpower Services Commission.



Employment figures, 1981: offshore 19,450, onshore, 16,499 (21,140 resident, 14,809 non-resident), total: 35,949. Forecast for 1991: offshore, 21,550, onshore, 25,940, resident, 33,900, non-resident, 13,600, total 47,500

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Useful reading for the business visitor

● **Grampian Quarterly Economic Review:** A regular survey of the oil and non-oil economic situation, with regular special studies on subjects such as the fish processing industry, offshore gas, the regional whisky industry and advance factories.

Issued by: The Department of Physical Planning, Grampian Regional Council, Department of Physical Planning (address above).

● **NESDA, Offshore Directory:** A directory issued by the North-East Scotland Development Authority for the oil-related industries in the Aberdeen area.

Issued by: NESDA, 57 Queens Road, Aberdeen, AB1 6YP.

● **Oil and Gas: Future impact upon Grampian region:** papers from a symposium organised by Grampian local authorities and the UK Offshore Operators' Association in 1982.

Issued by: Grampian Regional Council, Department of Physical Planning (address above).

● **Oil and gas-related prospects in Grampian (1982 update):**

Issued by: Grampian Regional Council, Department of Physical Planning (address above).

● **Skilled Manpower Needs in the Grampian Region:** A detailed study of the type of labour requirements for the area in the future.

Issued by: Manpower Services Commission, Training Division, Office for Scotland, 9 St Andrews Square, Edinburgh.

● **Scotland: Petroleum Annual:** an extensive list of offshore activities and onshore facilities.

Issued by: Aberdeen Petroleum Publishing Ltd, 37 Huntly Street, Aberdeen AB1 1TH.

● **Scotland: the oil and gas future:** a survey of the prospects for the industry surveyed by the Scottish Development Agency.

Issued by: Scottish Development Agency, 120 Bothwell Street, Glasgow G2 7JP.

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ABERDEEN III

FINANCIAL TIMES REPORT

Work has now begun on Aberdeen's ninth offshore support base

Harbour Board strengthens facilities

ABERDEEN HARBOUR is at the heart of the North Sea oil business. And it is here that the pulse of North Sea activity can be taken.

The discovery of oil has totally transformed the harbour, though a slackening of exploration activity has led to an increase in the number of supply boats tied to the quay, waiting for new contracts.

To handle the supply ships and associated onshore supply industries, the entire harbour has been rebuilt since 1980. The lock gates had to be dismantled and the quays rebuilt to allow the boats 24-hour access—there can be no question of a boat waiting for the tide in an industry where time is money.

Earlier this month, the Aberdeen Harbour Board opened its eighth offshore support base at Focra Quay and simultaneously announced the start of work on the ninth.

Today, Amoco, Chevron, Shell, Texaco and Total have leased their own quay facilities. Two other quays are owned by Seaforth Maritime and the John Wood group, two supply companies offering offshore operators "one-stop shopping" for supplies, ranging from drillpipes to hamburgers.

Public quays handle further traffic for independent operators.

Oil activity now accounts for about half the harbour's revenue in terms of dues on ships and goods.

A three-month overtime ban by registered dockers at the start of 1982 dented the harbour's overall operating surplus from £2.4m in 1981, to £1.4m last year. Now a long-term agreement for dockers, lasting into 1985, has increased the prospects for greater industrial stability.

Alongside the supply boats sailing past the breakwaters come the fishingboats. The city has a fleet of 45 vessels, 23 of

them trawler. But this is a shadow of what the harbour was in the past. In 1980 the amount of fish landed at Aberdeen was the lowest since 1886. Tonnage has increased to a current level of 44,981 tonnes.

The introduction of the National Dock Labour Scheme led to a gradual exodus of fishing vessels to other ports, such as Peterhead, where the scheme was not in operation.

But Aberdeen is still the largest fish market in Scotland and the place where 70 per cent of the fish processing is carried out.

Improved handling and a new fish market has seen the start of a slow return of fishing traffic to Aberdeen.

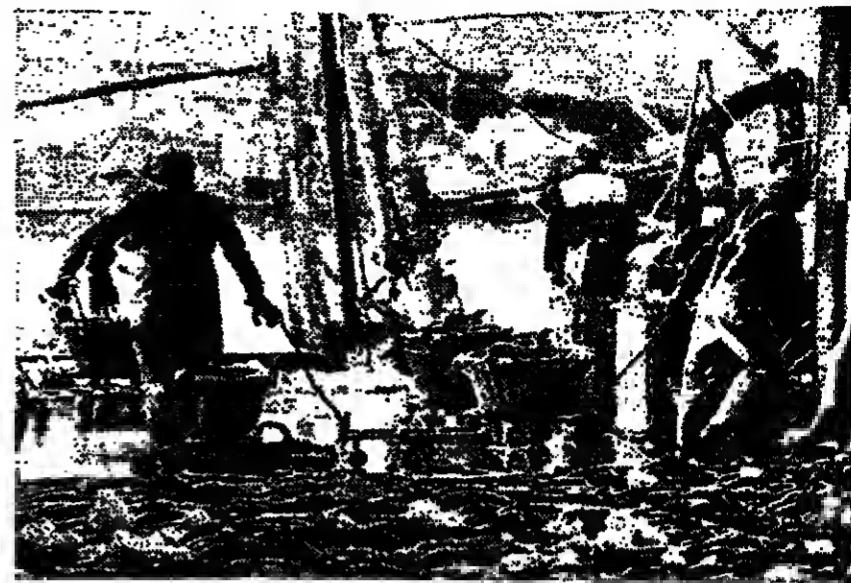
A recent study by the Sea Fish Industry Authority noted that today, on balance, Aberdeen has certain marginal advantages over Peterhead—a port to land fish.

About 30 per cent of the UK requirement in demersal fish—mostly haddock—are landed at these ports. The report pointed out that while landing costs can be 30 to 33 per cent higher in Aberdeen, the fish usually fetch a better price.

It noted the practice of overfilling boxes prevailed in Peterhead, but not Aberdeen, a further advantage for fishermen who could lose up to £18,000 a year through this practice in Peterhead.

General cargo also accounts of a sizable amount of activity at the port, and, currently, new cranes are being installed to improve grain and other bulk cargo handling.

Mr John Turner, the general manager of the port has been hunting a European ferry link for the International ferry terminal in the port. Aberdeen is already the base harbour for sea links between the mainland and Orkney and Shetland.



Aberdeen, with its fleet of 45 fishing vessels, has the largest market for fish in Scotland. It is the country's main fish processing centre.

BUSINESS CONTACTS

USEFUL business contacts and telephone numbers in Aberdeen include the following:

• Grampian Regional Council, Department of Physical Planning; Mr Trevor Spott, Director; tel. (0224) 682222.

• The North-East Scotland Development Authority (NESDA); Mr Gordon Sampson, Director; tel. (0224) 643222.

• Aberdeen District Council, Department of Development and Tourism; Mr Gordon Henry, Director; tel. (0224) 642121.

• Aberdeen Harbour Board; Mr John Turner, General Manager; tel. (0224) 52571.

• Aberdeen Airport; tel. (0224) 722331.

OFFSHORE EUROPE

MORE THAN 20,000 visitors from around the world are expected at this year's Offshore Europe exhibition at Aberdeen. The event (from September 6-9) will be held in a specially-erected seven-acre exhibition hall and will be opened by Mr Nigel Lawson, the Energy Secretary.

Offshore Europe '83 has attracted more than 700 exhibitors from such countries as Canada, Denmark, Finland, France, West Germany, Italy, the Netherlands, Norway, Sweden, Switzerland and the U.S.



The European Cup comes to Aberdeen: Lord Provost Collie appears on the flag-draped balcony of the Town Hall in Union Street, Aberdeen, to cheer the triumphant soccer team after its return from Gothenburg, Sweden, following the recent 2-1 victory over Real Madrid. Jubilant fans lined the 10-mile route from the airport.

Traditional industries take a battering

OIL has not blessed every corner of Aberdeen. This vast industry has, over the past decade, overwhelmed a small city of around 200,000 which traditionally served its rural hinterland.

While bringing a prosperity unparalleled in the city's history, Aberdeen's traditional industries have taken a battering—industries such as fish processing, paper textiles and engineering which all pre-dated the discovery of oil.

Oil has imposed a dual economy on the city in terms of wages, labour and costs—one for the offshore industry and one for traditional industries. Companies found large segments of their skilled staff lured away to better-paid oil jobs.

A recent study has shown that in many cases Aberdeen's manufacturing sector has been hit harder than that of other cities in Scotland.

The manufacturing sector shrank by nearly 20 per cent from 1977 and 1981. As with industry in other less heavily populated areas of the region, industrial body blows hurt more when there are fewer alternatives for employment than in large cities.

A study of the no-oil industry was published last month by Prof Hugh Begg and Mr Stuart McDowell.

At the core of the argument put by Grampian region, which includes Aberdeen, against the loss last year of assisted area status was the damage this would have on the non-oil sector.

The Government's decision to remove this classification with its associated grant structure because of the relative benefit brought by oil is now a disincentive for inward investment in manufacturing for Aberdeen.

The picture, however, has not been one of all-pervading gloom. The Begg McDowell report looked at the long-term implications and pointed to improvements and opportunities for new growth. It counselled the city and regional councils to develop a programme of industrial diversification.

The common fishing policy of the EEC promises some stability for the fish processing industries and, this accompanied by a new marketing drive to

Changing patterns in employment					
		Employee total		Change 1971-77	
		1971	1977	No.	%
Aberdeen LEOA	Manufacturing	25,293	22,807	- 2,486	- 9.8
	Total	99,229	119,517	+20,588	+20.7
Grampian	Manufacturing	33,469	35,361	- 1,158	- 3.5
	Total	159,981	178,524	+27,543	+17.2
Scotland	Manufacturing	659,000	615,000	-54,000	- 8.2
	Total	2,903,000	2,971,000	+68,000	+ 2.3
Source: Annual Census of Employment					

Source: Annual Census of Employment

No account is taken in these figures of the self-employed or of the armed forces

Comparisons of manufacturing trends in Scottish cities							
	Employment (000s)			Change 1977-81		Change 1979-81	
	1977	1979	1981	No.	%	No.	%
Aberdeen	21.7	21.0	17.1	-4.6	-21.2	-3.9	-18.6
Dundee	30.9	30.1	24.7	-6.2	-20.1	-5.4	-17.9
Glasgow	110.3	104.1	84.4	-25.9	-23.5	-19.7	-18.9
Edinburgh	34.8	35.3	31.5	-3.3	-9.5	-3.8	-10.8

Source: SCOMER.

Source: SCOMER

promote fish, may offer this sector a better future.

Textiles have gone through a period of contraction and no growth in the paper and board sector was forecast partly because of the distance from markets and rising costs.

Since the report was drawn up, however, Wiggins Teape has announced plans to spend \$8m modernising their plant at

Stoneywood Mill on the fringes of the city.

The thrust of new industrial development, according to the report, should be in small companies, value-added products—particularly in microelectronics—and products with good export potential or ones with sufficient demand locally to justify production.

The report underlined a Council

central theme of UK industrial lists in Aberdeen that considerable opportunities are missed in the areas of microelectronics which could be applied to the myriad of downstream activities of the offshore industry.

* Aberdeen's Manufacturing Industry; study by H. M. Begg and S. McDowell; Aberdeen City Council.

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Stability		
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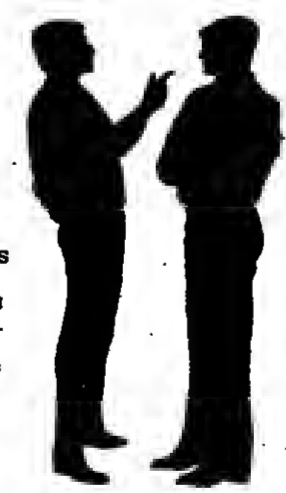
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Central African						
Dividends Paid		Stock	Price	Last	High Net	Low
Nov.	May	Falcon Rb. 50c.	250	19	070c	0 7 1/2
Nov.	May	Wankor Co. 25c.	21	25 1/4	05c	0 7 1/2
		7-ten Co. 4000 24	24	24		

	WACM 20c	171 $\frac{1}{2}$	-	-	-
	For Arroyo Gld Mines	see Southern Ventures			
	Balsamor Resources	22	-	-	-
	Black Hill Mins.	52	-	-	-
	Bond Corp.	57	-	9010c	2.3
Nov.	Agri. & Forestal Int'l Kins	152	11.3	01.42c	1.2
May	Nov. WGRA 50c	298 $\frac{1}{2}$	11.3	103c	
	WCA 50c Bond 20c	91			

Apr	Oct	Feb	Hampton Ave. 100	190	13 12	13 75	2.8
			W Haoma NW	38			
			W Hill Maserak N L	91			
			W Pinali Mining	16			
			W Kalhara Min 30c	289			

		WMetals Ex 50c	38	14 9		
		WMTrans East 20c	30			
		WM East Mtn AS1	34		0	
Oct.	Apr.	WM Ind Higgs 50c	260	12.7	Q5c	
		WM Incorp 20c	6 1/2			
		WM Fields Exp 2 1/2	6			
		WM Steel 20c	43			
June	Nov	WM North B Hn 50c	161	19 11	Q6c	1.3

Apr.	OCL	Wpamcont 125c	80	15.3	01.5c
		Wpamcont 125c	48		
		Wpamcont 125c	392		
		Wpamcont 125c	7		
		Wpamcont 125c	240		10.5c
		Wpamcont 125c	205		
		Wpamcont 125c	48		
		Wpamcont 125c	42		

	Swan Res 20c	33			
	United Goldfields	48			
	West Coast 25c	13			
	Western Cons. 50c	20			
Oct.	May	272	21.5	\$0.25c	
	Westn. Mining 50c	58			
	Whim Creek 20c	15			
	Wynd. Resources				

Age.	Nov.	AYER HILL SM1.	220	21 3/4	\$095c	1.0
		Geovv	128	680	—	—
		Gold & Base 121p	36	1074	—	—
July	Jart.	Gopeng Cons.	405	35.0	20.0	1.4
Aug		Hongkong	575	680	21.0	1.4
Jan	July	Janlar 121-p	13	7.6	1.5	2.8
September		Kanawing SM. 50	185	712	0.07c	0.8
		Malaya 30c	60	112	0.13	3.4

Month	Year	Company	Value	Unit	Price
Jan.	1981	Petaling SMT	330	73	060c
Aug.	1981	Sungei Besi SMT	220	31.12	0125c
—	—	SySorene Corp M51	45	974	wh34c
—	—	Tanjung 15p	102	15.6	93 5
Mar.	1982	Tongkah R. Yen SMT	70	21.5	050c
June	1982	Tronch SMT	290	4.10	7050c

Miscellaneous

	Anglo Ind. Dev.	83	-	-	-
	Colby Res. Corp.	85	-	-	-
Feb.	Cons. March 10c.	440	23.12	1040c	19
	Explora Gold.	3	-	-	-
	Highwood Res.	120	-	-	-
	Montclair Mining S.	139	175	040c	-
	Northgate CSl	405	977	-	-
		505	16.0	10	-

NOTES

Unless otherwise indicated, prices and net dividends are in pence and denominations are 25p. Estimated price/earnings ratios and covers.

taxation and nonvalued ACT where applicable; bracketed figures indicate 10 per cent or more difference if calculated on "net distribution." Covers are based on "maximum" distribution; to compare gross dividend costs to profit after taxation, exclude noncapital profits/losses but including estimated extent of off-investor ACT. Yields are based on middle price, are gross, adjusted to ACT 10 per cent and allow for value of declared distribution and right to 700th Stock.

Interest since reduced, passed or deferred.
 Tax-free to non-residents on application.
 Figures or report awaited.
 Not officially UK Listed; dealings permitted under Rule 163(4)(a)
 USM; not listed on Stock Exchange and company not subjected
 same degree of regulation as listed securities.
 Deal in under Rule 163(3).
 Price at time of suspension.

Not comparable.
Same interim reduced final and/or reduced earnings, indicates
Forecast dividend; cover on earnings updated by latest interim
statement.
Cover allows for conversion of shares not now ranking for dividend
or ranking only for restricted dividend.
Cover does not allow for shares which may also rank for dividend
a future date. No P/E ratio usually provided.

Tax free. ^b Figures based on prospectus or other official estimates. ^c Dividend rate paid or payable on part of capital, based on dividend on full capital. ^d Redemption yield. ^e Flat yield. ^f Assumed dividend and yield. ^g Assumed dividend and yield after tax. ^h Payment from capital sources. ⁱ Kenya. ^j Interim higher than previous total. ^k Rights issue pending. ^l Earnings based on preliminary figures. ^m Dividend and yield exclude a special payment. ⁿ Indicates dividend cover relative to previous dividend. P/E ratios based on latest figures.

Include a special payment: Cover does not apply to special
 symal. A Net dividend and yield. B Preference dividend passed
 deferred. C Canadian. E Minimum tender price. F Dividend and
 yield based on prospectus or other official estimates. H
 1983-84. S Assumed dividend and yield after pending scrip and
 rights issue. M Dividend and yield based on prospectus or other official
 estimates for 1984. K Figures based on prospectus or other official
 estimates for 1982-83. L Dividend and yield based on prospectus

REGIONAL AND IRISH

		IRISH		
Money Inv. 200.....	61	+1	Even 15pc 1983	£100
Gov't. Est. 50p.....	260		Nat 9 1/4% 84/89.....	£87 1/2
City & Rose £1.....	£12		Fin 13% 97/02.....	£97 1/2
Irish Pkg. 5p.....	36		Alliance Gas.....	£83
			Armitage.....	£85

... ..	725	4 1/2	Final round	76	...
... ..	290	Jacob	76	...
... ..			T.M.G.	79	...
... ..			Under	73	...

OPTIONS

House of Fraser	17	Ud Drapery	14
House of Fraser	17	Victoria	13
I.C.I.	35	Woolworth Hld.	27
Irrons	11		
I.C.I.	81	Property	
Ladbrokes	20		
Legal & Gen.	98	Birt. Land	01
Leg. Service	30	Can. Counters	30
Lloyds Bank	45	Land Sec.	35
McAl	31		

Open I. J.	5	Mills & Spencer	20	7 o'm & City	3
Arion Ord	35	Midland Bank	35		
...	21	N. E. I.	18		
...	87	Nat. West. Bank	50	Brit. Petroleum	52
...	12	P. & G. Old	14	Burmah Oil	14
...	22	Plessey	50	Chamberlain	5
...	6	Racal Elec.	45	KCA	8
...	36	R. H. M.	6	Primer	4

190	71	16	Albino	
32	Trica	14		
55	Thorn EMI	50	Charter Com	28
42	Trudhouse	20	Com. Gold	50
16	Turner & Newall	41	Lorino	81
34	Univis	89	Rio Tinto	55

per annum for each security

OIL AND GAS—Continued

Friends aid	Birth	Age	Last	Div	Gr	Yr
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[illegible]

4-Floyd Oil 10p.	105	1	1	1	1
17-Gafric Oil...	30	1	1	1	1
17-Gema NL 50c	60	1	1	1	1

[illegible]

	Palmer Int'l.	33	-	-	-	-
	Pennine Res.	21	-	-	-	-
Dec	Petrocon 12 ¹ / ₂	154	9.5	3.75	0	3

[illegible]

lay	African Lakes...	26	21.2	1.1	1.2	6.1
one	Aust. Agric. 50c	160	30.4	0.10c	♦	3.1

Grade	Stock	Price	Last	Ch	CW
Best	Anglo-Indonesian n	87	19.7	1.0	4
1st	Batavia n	87	19.7	1.0	4
2nd	Bergam 100	86	19.6	1.0	4
3rd	Candellif 100	86	19.6	1.0	4
4th	Java n	86	19.6	1.0	4
5th	Sumatra n	86	19.6	1.0	4
6th	Central 100	86	19.6	1.0	4
7th	Java n	86	19.6	1.0	4
8th	Sumatra n	86	19.6	1.0	4
9th	Java n	86	19.6	1.0	4
10th	Sumatra n	86	19.6	1.0	4
11th	Java n	86	19.6	1.0	4
12th	Sumatra n	86	19.6	1.0	4
13th	Java n	86	19.6	1.0	4
14th	Sumatra n	86	19.6	1.0	4
15th	Java n	86	19.6	1.0	4
16th	Sumatra n	86	19.6	1.0	4
17th	Java n	86	19.6	1.0	4
18th	Sumatra n	86	19.6	1.0	4
19th	Java n	86	19.6	1.0	4
20th	Sumatra n	86	19.6	1.0	4

May	Highlands MS0c	102	114	v015c	φ
Nov.	Kuala Kepong MS1	72	73	v0121c	1.2

[illegible]

Feb.	Groothuis 26c	1131	13.12	0116c	2.0
Nov.	Kinross R1	117	21.3	0127c	1.7
Nov.	Leslie 65c	282	21.3	0135c	1.5

[illegible]

Feb.	SL Helena R1	1242	13.12	1090c	2.7
Nov.	Unsettled	Fl1	21.3	1090c	1.3
Dec.	Westcom 50c	906ad	9.5	10123c	1.0

[illegible]

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FINANCIAL FUTURES

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FINANCIAL TIMES SURVEY

AEROSPACE

The recession has severely depressed commercial airliner sales, but other areas of world aerospace, such as military and space activities, have remained remarkably buoyant. The overall outlook is for business worth over \$500bn. throughout the next decade

Waiting for the world recovery

BY MICHAEL DONNE,
AEROSPACE
CORRESPONDENT

THE WORLD'S aerospace industries go to the Paris International Air Show this week hopeful that the signs of an improvement in the world economic situation in recent weeks do indeed presage a recovery in their own fortunes.

Although the aerospace community as a whole has weathered the recession better than many other industries, it has still suffered severely, especially in civil airliner and engine manufacture.

Activity in the military aircraft sector has remained more buoyant, stimulated by continued demand for combat aircraft, engines and guided missiles in many countries, particularly in the Developing World. Even here, however, the activity has stemmed more from the continuation of major programmes (such as the Tornado multi-role combat aircraft in Western Europe) begun before the recession struck, than from new programmes subsequently initiated.

Moreover, even the military

market has been characterised by a marked intensification of competition for the few new orders prevailing, and this situation shows no signs of diminishing.

There is little doubt that in many companies in the U.S. and Western Europe where both civil airliner and military aircraft manufacture are undertaken, the profits earned on the military side have been supporting the civil operations. This seems likely to continue, at least until demand for commercial aircraft has recovered sufficiently to enable airliner production to stand on its own feet again.

At the same time, the space sector has been developing rapidly, with rising demand for satellites of all kinds, but especially for telecommunications (including direct broadcasting), weather forecasting and Earth resources monitoring — the three big areas of space expansion. Demand for satellites and their supporting ground installations is forecast to amount to between \$20bn and \$30bn, up to the end of this century.

There is no doubt that the commercial airliner and engine manufacturers have passed through the worst two to three years in their history. During 1982, the total of new jet airliners of all kinds ordered world-wide amounted to only 223, worth about \$5.35bn, well down on the total of 382 ordered in 1981, and less than a third of the total ordered in the late 1970s, when the annual rate was 700 to 800 aircraft a year.

The effects have been transmitted with labour lay-offs running through the entire aerospace industry, through to the myriad component and equipment contractors in associated industries. These cuts have been

especially severe in the aero-engine industry, and again especially in Rolls-Royce, where the redundancies continue, with another 6,000 due to be laid off this year, on top of those laid off in 1981 and 1982.

But despite the difficulties of the past two to three years, and the probability that the inflow of new orders will remain low until the airlines have substantially re-established their financial situation on a sounder basis, the manufacturers remain optimistic for the long-term.

Demand

Airbus Industrie, the European airliner manufacturing group in which British Aerospace has a 20 per cent stake, believes that the total market for new jet airliners between now and the end of this century is likely to amount to 6,700 aircraft, worth about \$275bn. Airbus aims to win about 34 per cent of this market, or over \$90bn worth of business.

Boeing of the U.S., the world's biggest jet airliner manufacturer, believes that between 1983 and 1995, there will be a demand for about 4,220 new jets, worth some \$167bn.

Douglas Aircraft, division of McDonnell Douglas of the U.S., believes that the world's airlines will need about 5,000 new aircraft between now and 1995, although it does not put a cash value on that figure.

On the engine side, Pratt & Whitney is even more optimistic, believing that total demand for airliners of all kinds could reach as high as 10,000 by the end of the century, although this figure includes smaller transports in

the so-called "commuter" or "third-level" aviation category. All these forecasts broadly agree that once the recession is over, a major upsurge in demand for civil aircraft will emerge. It will stem not only from a revival of traffic growth (with an annual average increase of about 6 per cent) but also from the need to replace existing ageing and fuel-inefficient fleets, while new noise regulations becoming effective in about 1985-86 in the U.S. and Western Europe, including the UK, will render obsolete some older jets, requiring new orders as a matter of urgency in some countries.

Even if the manufacturers' forecasts prove to have been over-optimistic, it does seem likely that the world's aerospace industries will face a substantial volume of business through the rest of this decade and through to the end of the century.

Apart from the Boeing forecast of \$167bn worth of "front-line" airliner business, it is estimated that demand for civil and military helicopters could amount to some \$36bn over the next decade in the "general aviation" category (that is, covering all kinds of aircraft outside the airliner and helicopter fields, including business aircraft and private and leisure demands), together with at least another \$15bn for "commuter airliners".

The U.S. General Aviation Manufacturers' Association believes that forecast increases in U.S. Gross National Product, corporate spending and corporate profits in 1983, all promise a rising trend of business that will continue through the 1980s.

Collectively, therefore, the volume of aircraft and engine business through the 1980s could amount to well over \$200bn, and this figure might prove to be conservative if the recovery from the recession is swifter and stronger than many currently dare hope.

If to this is added space business, a collective volume of over \$250bn of commercial aerospace business worldwide seems not unreasonable during the coming decade. Military business, forecast to run at anything between \$25bn and \$30bn a year through the next decade, or a total of up to \$250bn-\$300bn, means that overall the world's aerospace industries can expect business of over \$500bn through the next decade.

Redundancies

The manufacturers' main problem is that they have to survive over the next year or two — a period of lower production activity reflecting the low level of orders of recent years. New orders booked either this year or next are not likely to be reflected on production lines until late 1984 or early 1985, unless empty slots have been left specifically for that purpose, and there may even have to be further redundancies in the manufacturing industry later this year.

One of the major outstanding decisions in the commercial airliner field is whether or not any one, or all, of the major manufacturers will formally launch soon the development of a new, so-called "150-seater" jet airliner, for service from the late 1980s. All the major companies have been undertaking studies — Boeing with its "7 Dash 7", 737-400 and short-fuselage 757 concepts, Airbus Industrie with

the A-320, and McDonnell Douglas with its D-3300-1 — and combined research and development spending on these designs now probably runs well over \$100m.

If Airbus Industrie were to formally launch the A-320 this year, Boeing would probably immediately counter with its 737-400, which it believes it could put into the market by 1987, beating Airbus, and at a cheaper price. A similar situation exists with the engine. So far, the earliest available engine would be the Franco-U.S. (General Electric-Snecma) CFM-56 in its Dash 4 version, which Airbus is already discussing for its A-320, while Boeing would also use it in the 737-400.

This would be available earlier than the all-new, advanced technology engine for the new generation of 150-seaters, which is now being planned by Rolls-Royce and Pratt & Whitney in conjunction with the three Japanese aero-engine companies (Ishikawajima-Harima Heavy Industries, Kawasaki Heavy Industries and Mitsubishi Heavy Industries) along with Motoren und Turbinen Union of West Germany and Fiat Aviazione of Italy.

The aim is to get the new engine, which will cost upwards of \$1.5bn to develop, certificated by late 1987, but if there are any difficulties over the anti-trust laws, the starting date could slip, putting the engine back to 1988-89 or even later. Many believe that this would be a more realistic target date, anyway, again because of the need for a major recovery in the fortunes of the world's airlines.

The new engine and new airframe would then be able to come together for the early 1990s, when overall economic conditions would be likely to be more favourable for the placing of orders by the airlines.

The sizes of the investments involved — \$1.5bn on a new engine, and up to \$2bn each for any of the rival airframes

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Editorial production: Michael Strutt	
Layout: Phil Hunt	

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Westland - technology working.

Westland - technology working to meet the competitive challenges of the world's markets - markets that are becoming progressively more difficult. The Westland response is to make major investment in new product developments.

Westland 30 - Britain's new award-winning civil and military transport helicopter, already in service with British Airways and Airspur of Los Angeles. Westland 30 was financed by the Company and has now been reinforced by H.M. Government who, accepting its competitive strength, have provided further investment to support the development of derivatives.

Lynx 3 - The newest and most advanced development of the Team Lynx range of military helicopters. A high technology battlefield helicopter with day or night all weather capability.

EH 101 - The product of a collaborative venture between Westland and Agusta of Italy. Full development approval by the governments of the U.K. and Italy is expected during 1983 for this anti-submarine, tactical utility and civil helicopter with a world market potential approaching 1,000 helicopters. Development of EH 101 will be funded jointly by industry and government in Britain and Italy.

AP 188 - The world's first diesel-powered amphibious hovercraft with a 100 seat civil capacity and high suitability for numerous military roles. Now in passenger service with Hovertravel in U.K., this cost-effective and low noise hovercraft capitalises on Westland advanced skirt technology and is already the subject of worldwide interest.

Composite blades - A major advance in the development of helicopter technology. Composite rotor blades will directly replace metal blades, have a much longer life and considerably reduce maintenance and operating costs. The initial production is for the Westland Sea King but the new blades are applicable to the Sea King range of helicopters which are in worldwide service from several manufacturers. Westland Aerospace Division is responsible for composite blades business, one of a wide range of products developed from the Westland technology base.

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AEROSPACE II

Fierce battles in engines market

6... the major aero-engine companies are turning increasingly to international collaboration to spread the burden of development costs and so widen the potential market. 9

ALL THREE of the world's major aero-engine builders—Rolls-Royce, General Electric and Pratt & Whitney of the U.S.—have suffered along with the rest of the aerospace industry from the cuts in orders stemming from the financial difficulties of the world's airlines. Over the past two years or more they have been obliged to rely substantially on military business. There are now signs that some time over the next year or so this situation may change, and that demand for commercial engines will recover sufficiently to enable the manufacturers to look with more confidence to the future.

Confident

Despite their problems, all of the big three engine builders remain confident about the long-term future for their industry, despite the current difficulties. Pratt & Whitney, for example, believes that the airline industry is heading for another upturn in business through the 1980s. Last year, deliveries of new jet airliners from all sources were below 300, and the excess aircraft capacity currently in the market will continue for another two years. But from 1985 on the forecast is positive, with deliveries rising to about 500 aircraft a year by 1988, and then continuing at the 500-plus a year level through to the end of the century.

The airlines, in Pratt & Whitney's view, are likely to need up to 10,000 new aircraft by the year 2000, of which about 4,000 will be needed over the next ten years comprising 2,400 narrow-bodied jets for short-range work, about 1,200 medium-range wide-bodies and

400 long-range wide-bodies. This will generate a demand for about 25,000 engines by the end of this century, of which close to half (or about 11,600 engines) will be needed by the end of this decade, as the chart shows.

With such a sizeable market, there should be room for all three major manufacturers, but whether all of them can continue to build engines across the wide spectrum of types that are currently on offer or projected remains to be seen. Aero-engine investment is expensive—any new engine can cost upwards of \$1.5bn to develop, with the result that, as in aircraft, the tendency is more towards derivatives of what is already available, rather than entirely new powerplants.

This massive investment requirement is likely to test the courage and stamina of Rolls-Royce and its sole shareholder, the British Government, severely in the immediate future because of the major investments that will be needed to sustain the Rolls-Royce programme across the wide range of its activities.

Rolls-Royce managed a marginally higher turnover in 1982 at £1,49m, but this disguised a substantial fall in available work, stemming from the recession in airline business.

While the company's longer-established engines, such as the civil Spey jet, Dart turbo-prop, the Viper for business jets and the Adour for military aircraft remained profitable and substantial businesses (as did the Pegasus for Harrier vertical take-off aircraft and the RB-199 for the Tornado multi-role combat aircraft), Rolls-Royce was geared to produce in the early 1980s more than 300 large-fan engines of the RB-211 type each year.

As a result of the recession, estimates have been progressively revised downwards, and the latest forecast is that fewer than half a million of this figure will be produced in 1983. This lack of demand for the large civil engines, and a lower than expected requirements for spares, has reduced inventories and lead times, producing a reduction in workload and a consequent reduction in employment.

This situation illustrates clearly the dilemma facing the company, and indeed all major world aero-engine manufacturers. The costs of developing a new engine are very high, often running into hundreds of millions of pounds, and the rewards are often substantially delayed, perhaps not emerging

for seven to 10 years after initial launch of the project.

At the same time, since most of the "big three" aero-engine builders are involved in a wide range of engines across the range and payload spectrum, they often have many hundreds of millions of pounds at risk with no guarantee of profits, even after many years.

Moreover, to try to remain in this business requires a continued injection of new research and development finance, on which the return can by no means be guaranteed. Rolls-Royce's own R and D injection of £131m last year is only one company's outlay for one year. For the aero-engine in-

of a new engine in the 20,000 lb to 30,000 lb thrust class, for any new generation of short-range 150-seater jets and for other aircraft types, that may emerge in the mid to late 1980s.

This agreement, which followed many months of negotiation between the partners, is still the subject of approval by the shareholders of the companies concerned, which in the UK means the Government.

The Rolls-Royce-Pratt and Whitney plan envisages those two companies each having 30 per cent of the work (and each putting up 30 per cent of the cash), with the remaining 40 per cent being shared by the

world aero-engine manufacturers continues unabated, in both the civil and military fields. In the commercial engine field, Rolls-Royce, with its Dash 535 version of the RB-211, has a head-start over Pratt and Whitney in powering the new Boeing 737 twin-engine short-range jet airliner, but Pratt and Whitney is now emerging rapidly with its PW-2037, which will power Delta Air Lines' 737s.

Major rivalry between these two companies is likely through the rest of this decade, with these engines, both of which can be expected to be developed further in the battle for orders. Already Rolls-Royce has developed a follow-on version, the 535-E4, with even further improved fuel economy over the existing 535C. The E4, with 40,100 lbs thrust at take-off (against the 37,400 lbs thrust for the 535C) is due into airline service next year.

Beyond that, further development of the 535 to higher thrusts are planned for a wide range of airline applications, including the H4 version of up to 41,500 lbs thrust for future long-range aircraft, such as new developments of the McDonnell Douglas DC-10 tri-jet (the MD-100), and possibly even the Boeing 747 Jumbo jet. Rolls-Royce is gearing much of its future to the 535 engine.

At the upper end of the thrust scale, Rolls-Royce faces considerable competition with the 524 version of the RB-211 from the recently announced Pratt & Whitney PW-4000 series of engines and from new developments in the General Electric CF6-80 series.

Fuel savings

The PW-4000 series of engines is designed to give substantially better fuel consumption over existing "big thrust" engines, together with considerable savings in maintenance costs stemming from fewer working parts. The series will include engines between 48,000 lb and 60,000 lb thrust and the first engine will be ready by July 1984.

Aircraft for which it will be suitable will include both current and derivative versions of the Boeing 747 Jumbo, the Boeing 767 wide-bodied twin-engine short-to-medium-range airliner, and the Airbus A-300 and A-310 wide-bodied jets.

Rolls-Royce remains calm in the face of the Pratt & Whitney threat. It has now begun discussions with world airlines and aerospace manufacturers on the possibility of developing a

WORLD COMMERCIAL TURBINE MARKET
ENGINES AND SPARE PARTS 1984-93

Aircraft type	U.S. market		Non-U.S. mkt.		World mkt.	
	Units 1984	\$m	Units 1984	\$m	Units 1984	\$m
Long range	550	5.0	2,500	20.0	3,050	25.0
Medium-short range twin aisle	1,050	8.0	2,100	14.5	3,150	22.5
Medium-short range single aisle	2,250	10.0	3,150	12.0	5,400	22.0
Total market	3,850	23.0	7,750	46.5	11,600	69.5

Source: Pratt and Whitney Aircraft (United Technologies) U.S.

dustries as a whole world-wide, the R and D outlay probably runs to well over \$1bn, with no guarantee of profits.

It is for this reason that the major aero-engine companies are turning increasingly to international collaboration to spread the burden of development costs and so widen the potential market.

Rolls-Royce for many years has been involved in international collaboration on a wide range of aero-engine programmes, both civil and military, especially with the aero-engine builders in Western Europe, although this has not prevented the company from undertaking private-venture developments in areas where it believes it has a chance of reaping adequate rewards.

Potentially one of the most significant long-term developments in world aero-engine affairs, however, has been the provisional agreement between

Rolls-Royce, Pratt & Whitney of the U.S., and other aero-engine companies in Japan (Ishikawajima-Harima Heavy Industries, Kawasaki Heavy Industries and Mitsubishi Heavy Industries), West Germany (Motoren und Turbinen Union) and Italy (Fiat Aviazione), to collaborate on the development

other companies, the three Japanese companies jointly having the biggest share. The aim is to settle details of the work and cost-sharing programme over the next few weeks, for final agreement by June 30.

At that time a new joint company, International Aero-Engines, will be formed to become responsible for the design, development, manufacture, marketing and in-service support of the engine over its life, which could extend to more than 20 years.

The new engine will be based substantially upon technology developed by Rolls-Royce and its three Japanese partners for the RJ-500 engine programme, of which two demonstrator engines have already been built, as well as on technology evolved by Pratt & Whitney in its own PW-2037 engine programme.

Should the international venture still fail to emerge, Rolls-Royce and the Japanese makers probably would revert to work on the RJ-500 while Pratt & Whitney would develop a new engine of its own, based on its PW-2037 technology.

While this collaboration is evolving, however, the competition between all three major



Pratt and Whitney's PW-2037 engine in altitude test chamber at the company's plant at East Hartford, Conn., U.S. This engine is Pratt & Whitney's answer to the Rolls-Royce RB-211-535 in the Boeing 737 airliner.

Wait for recovery

CONTINUED FROM PREVIOUS PAGE

new version of the RB-211, the

series 600, which could have a

thrust higher than the 58,000 lb

of the D4 version of the RB-211-

524 which is about to enter

service.

This new version of the RB-

211-624 would also be suitable

to compete with engines from

General Electric, the third of

the "big three" in the world

aero-engine business. General

Electric has established a strong

competitive base against Pratt

& Whitney in the A-300, A-310

and 747 markets with its CF6-80

series of "big thrust" power-

plants.

The overall CF6-80 series of

engines already powers more

than 3,000 aircraft (either in

service, on order or on option),

and General Electric is now

developing its latest variant, the

CF6-80C, rated at 58,000 lbs to

62,000 lbs thrust, for certifi-

cation in June 1985.

General Electric says this

engine is intended for various

commercial applications, in-

cluding the improved Airbus

A-300-600, the stretched upper

deck version of the Boeing 747,

and stretched derivatives of the

767. General Electric argues

that far from being an entirely

new initiative, the Pratt &

Whitney PW-4000 series is in

effect "a response" by Pratt &

Whitney to GE's own CF6-80C,

which has already demon-

strated in excess of 62,000 lbs

thrust and the lowest fuel con-

sumption of any commercial

engine in its thrust class.

Michael Donne

(A-320 7 Dash 7, D-3800-1)

makes the whole question of

financing a matter of vital im-

portance.

On the military side, the

major question posed over Wes-

tern Europe is when to launch

a new international advanced

combat fighter programme, so

as to replace by the end of this

decade or early in the next the

current Jaguar jet strike-

trainers in the RAF and French

air force and Phantom jets in

the West German Luftwaffe.

The Government's contribu-

tion is expected to be about

\$60m to \$70m, covering air-

frame, engine, avionics and

equipment, with substantial

funds coming from the equip-

ment and other contractors

(who have already spent about

\$25m of their own money on the

venture).

These two major programmes

—the prospective 150-seater air-

liner and the future European

combat aircraft—together repre-

sent the biggest individual air-

craft ventures likely to be

undertaken in Western Europe

throughout the next decade,

and as such are of great

importance not only to the air-

frame and engine industries,

but also to a wide range of

sub-contractors, equipment, com-

ponent and material manufac-

turers.

Artist's interpretation of turbulence control test.

BREAKTHROUGH
ADD SOUND TO
JET ENGINES TO MAKE
AIRPLANES QUIETER

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MCDONNELL DOUGLAS



AEROSPACE III

Manufacturers desperate for orders

Every potential contract is heavily contested with a ferocity that has surprised many in the industry worldwide.

ALTHOUGH THERE may be some slight signs of an economic recovery in the U.S., the immediate outlook for the world's major aircraft manufacturers remains bleak, as the airlines continue to hold back from placing the orders for new equipment that the makers desperately need to keep their production lines busy.

The extent of the recession the jet builders have experienced over the last two years can be gauged from the fact that during 1982, the total of new jet aircraft of all kinds ordered reached only 223, worth about \$5.35bn, well down on the total of 332 new jets ordered in 1981, and less than a third of the total ordered in the late 1970s, when the annual number was between 700 and 800 aircraft.

Hoping

Overall, the three major manufacturers — Airbus Industrie in Western Europe, and Boeing and McDonnell Douglas of the U.S. (who between them account for the bulk of all airliner sales) — are desperately hoping that the signs of overall economic recovery emerging so far this year will prove to be lasting, and that better times may be on the way.

With few big orders immediately in prospect, and most new contracts involving small numbers of aircraft requiring substantially increased efforts to win, the big jet airliner builders will have to live off their accumulated backlogs through 1983 and 1984, pending any significant upturn in the airlines' fortunes that will encourage them to place new orders.

There are some saving factors in this grim situation. One is that many of the world's existing airliner fleets are ageing, and will need to be replaced in the remaining years of this decade.

Another is that the imminence of new noise legislation (from 1985-86) will render many existing jets obsolete, requiring their replacement. Boeing of the U.S. estimates that the value of this replacement may

be on grounds of age and noise alone could be about \$55bn by 1985.

It is not surprising that, in view of the current paucity of new orders, every potential contract throughout the world air transport industry is heavily contested by the major manufacturers. Airbus Industrie in Western Europe, with its 250-seat A-300 and smaller 200-plus seat A-310 short-to-medium range jets is fighting Boeing with its 767 and 737 twin-engine jet airliners with a ferocity that has surprised not only Boeing but also many others in the world aerospace industry.

Airbus is also seeking to expand its product range, for example by developing the projected 150-seater A-350 for which it believes there is a big market through to the end of this century, amounting perhaps to more than 1,500 aircraft.

Plans for that aircraft are still being refined in detail, but it is possible that by the time of the Paris Air Show in July, these may have reached the point where Airbus may be able formally to announce that the venture is at last firm. At the same time, Airbus Industrie is studying plans for other new aircraft, such as the TA-11 200-seat four-engine long-range (6,000 nautical miles) jet to replace the existing Boeing 707s and DC-8s in world service, where longer range is required with less capacity than the current large Boeing 747 Jumbo jets or DC-10 tri-jets provide.

Another new venture under study is the TA-9, a twin-engine development of the A-300, with a stretched fuselage to give seating capacity up to 410 passengers according to the configuration desired by airlines.

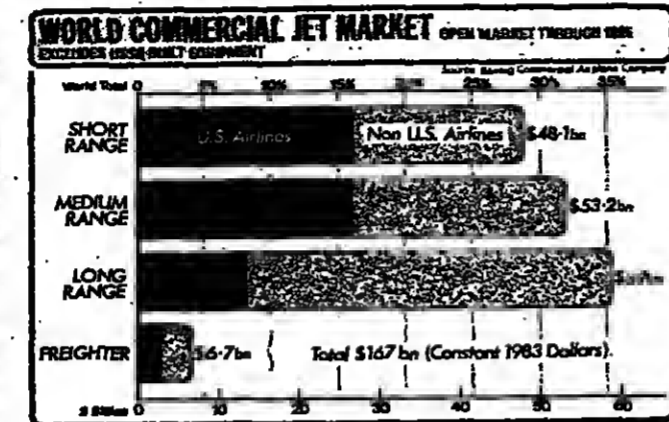
Beyond that, the TA-12 is a plan for a twin-engine jet for medium- to long-range routes not affected by over-water regulations that limit twin-engine aircraft operations, such as London-Colombo, Frankfurt-Bangkok, the Middle East to Japan and South America to the U.S.

The costs of developing any one of these new versions of the existing Airbus product line will be high, and they are not likely to be attempted until the world's airlines are in a stronger position to buy such refined aircraft. In the meantime, Airbus will be concentrating its development plans on derivatives of the A-300 (the Series 600 model, for example, with its improved fuel consumption and

range/performance) and the Series 300 version of the A-310, which will be capable of flying longer distances.

With total sales of 350 Airbus buses to date (248 A-300s and 102 A-310s) with many more of each type of aircraft on order, Airbus Industrie has already demonstrated that Western Europe can offer formidable competition to the U.S. in commercial airliner markets.

Despite the current paucity of orders, Airbus Industrie remains optimistic for the long-term. Its forecasts of the future market for jet airliners, once the recession is ended, indicate a demand for about 6,700 aircraft, worth about \$320bn, up to the end of this century. Of this, Airbus expects to win a 34 per cent share, representing about 2,250 aircraft.



These will be primarily in the short-to-medium range market, which Airbus believes will account for some 77 per cent of total demand, or \$253bn, with the rest (\$76bn) being in the long-haul market. This accounts for Airbus Industrie's current emphasis on the short-to-medium range A-300, A-310 and A-320, although it is not ignoring long-range possibilities as the new long-range versions of both the A-300 and A-310, and the longer-term TA-11 and TA-12 studies, show.

Backlog

Boeing, the biggest jet airliner manufacturer in the world, with total sales at the end of last year of 4,744 aircraft, has been suffering from the recession like everyone else, but has been weathering it better than most because of the

substantial state of its backlog of close to \$15bn, representing several hundred jet airliners of all types.

Although work programmes have been reduced, and the company has been cutting its labour force (with further layoffs occurring this year), Boeing nevertheless appears to be confident that it will ride the remainder of the recession. The company believes that already there are signs of a recovery in the U.S. economy, which it believes will have its effect on the aerospace industry either later this year or early in 1984, and it believes that by the mid-1980s the tempo of airliner ordering, and consequently production, will be rising again.

This optimism is reflected in the company's forecasts of future business. Between now and 1985, Boeing is forecasting

(European and U.S.), falling in 1984 and 1985 (reflecting the slower inflow of new orders in the 1981 and 1982 period as a result of the recession), but rising steadily thereafter.

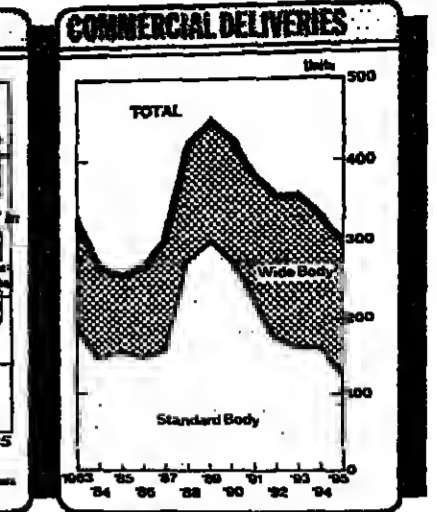
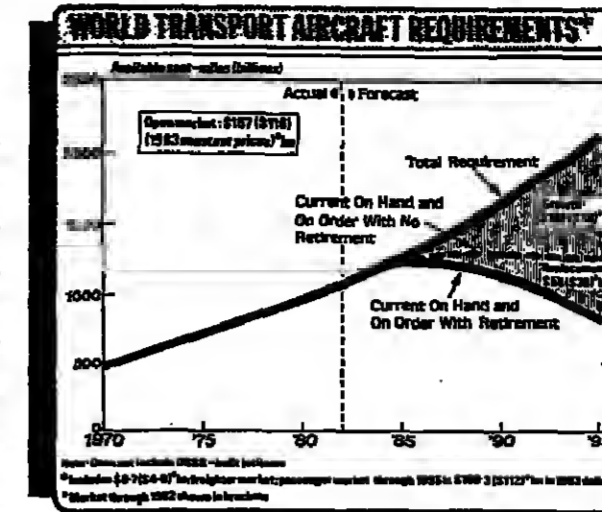
From 1985, deliveries will continue on a rising curve, reaching a high point of 450 jets in 1989, reflecting the fulfilment of the rising volume of orders which is expected in the early to mid-1980s as the recession fades. Thereafter, the deliveries curve is expected to slacken to about the 300 jets a year level by about 1995.

Boeing's estimates of the market suggest that of the \$167bn of total deliveries, about \$45.3bn will be accounted for by short-range jet airliners (mostly for aircraft seating up to about 160 passengers a time), with \$53.2bn accounted for by medium-range jet airliners (seating between 160 and 250 a time), \$55bn for long-range jets (mostly seating 250-plus passengers a time) and about \$6.7bn for all-cargo jets.

The markets in terms of numbers of aircraft are analysed as to 500 aircraft in the long-range category (Boeing 747s or Douglas DC-10s), 1,150 aircraft in the large medium-range category (Boeing 767s or Airbus A-300s or A-310s), 1,850 aircraft in the short-to-medium-range bracket (Boeing 737s or prospective 150-seaters) and about 1,050 aircraft in the short-range category (Boeing 737s or McDonnell Douglas DC-9s).

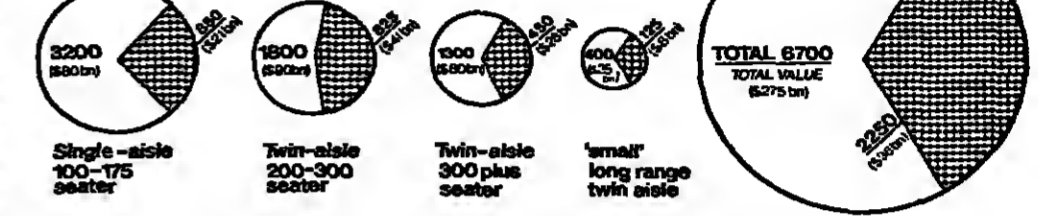
Boeing's product line ranges all the way from the big 747 Jumbo jet, seating up to 400-plus passengers, down to the small 737, which is available in various versions seating between about 115 and 140 passengers. In between is the 220-plus seat 757. The long-running, three-engine 727, which has been the world's best-selling jet since 1970, with more than 1,830 sold to over 100 customers worldwide, is now being phased out. The last passenger 727 has just left the production line and the 15 remaining 727 aircraft being built are all-cargo jets.

The new best-selling jet is the small 737, of which more than 1,050 have been sold to more than 114 customers. Over 900 of these 737s have been delivered and production is running at a rate of seven aircraft a month. Of the new Boeing jets, the 737 wide-bodied, twin-engine aircraft has sold 178, while the smaller 737-200 has sold 124. The new



AIRBUS BUSINESS OUTLOOK TO 2000

(VALUE FIGURES IN BRACKETS ARE AT 1982 PRICES)



version of the 737, the 737-300, which is due for roll-out and delivery next year, has sold 28 aircraft.

The big Boeing 747 Jumbo remains in a class by itself. Although McDonnell Douglas has made some inroads on the long-haul Jumbo jet market, Boeing remains dominant with over 600 747s ordered in various versions, of which over 570 have now been delivered to 67 companies in 48 countries.

Much of the existing production is concentrated on the "stretched upper-deck" version, the 747-300, in which the top deck of this aircraft is stretched by 208 inches to give extended seating capacity, enabling up to 452 in the standard version. Total orders for the 747-300 total 32 and most of the deliveries this year will be of this version.

Looking to the future, Boeing is studying several new versions of the 747 under the broad designation 747-X. These include a variant with a stretched fuselage and a new wing, to seat between 550 and 650 passengers, and another version with the upper deck stretched all the way to the tail

to give a true "double-decker" seating between 600 and 800 passengers according to airline choice.

Equipment accounts for a varying proportion of the final price of the completed aircraft or engine. It is estimated that one third of the total cost of airliners when delivered to the customer is accounted for by equipment of one sort or another.

Agreement

A recent example of international co-operation between companies in the field of advanced electronic equipment for commercial airliners is the announcement last month of an agreement between Marconi Avionics of Rochester, Kent, England and Honeywell of Minneapolis, in the U.S.

Under a sales and distribution agreement between the two companies, the Honeywell advanced laser inertial navigation system (LINS), used on the latest Boeing airliners, the 757 and 767, is to be incorporated in military systems offered by Marconi Avionics. The agreement includes an option for a later manufacturing licence for the LINS equipment to be made by Marconi

Avionics in England. The agreement gives the British company exclusive rights to supply military LINS applications in the UK and for applications as a component of military aircraft avionics systems for export to countries outside the U.S. and UK.

The Honeywell H421 and H423 military systems, covered by the agreement, are being offered for the Angle-U.S. derivatives of the Harrier vertical take-off aircraft, the AV-8B and the Royal Air Force GR-5, and as a standard inertial navigation system for the U.S. Air Force.

The laser gyro from Honeywell, at the heart of the LINS, has made the traditional complex mechanical spinning wheel gyroscopes in older inertial navigation systems obsolete.

The use of colour cathode ray tubes in becoming standard practice in airliner cockpits for the display of flight performance information. The Boeing 767 and 757 twin-jet airliners and the Airbus Industrie A310 airliner were designed from the outset to use these displays in place of earlier electro-mechanical dials and gauges.

Michael Donne

Sparrow and Sidewinder: double deterrent in Europe's air defense.

Slicing through NATO airspace, this F-15 goes through its paces as one of the world's most advanced fighters. It's suitably equipped with the world's most advanced medium- and short-range air-to-air missiles: Sparrow and Sidewinder.

Since the original Sparrow III was developed some 30 years ago, Raytheon has continued as prime contractor for succeeding models of this radar-guided missile system. And we are currently in full production on the latest version of Sparrow, the AIM/RIM-7M, with greatly improved capability.

Similarly with Sidewinder. As a long-term industrial support contractor for the U.S. Navy, we produced the guidance control section and fuzing system for the currently deployed AIM-9L, and have now entered production on the next generation Sidewinder AIM-9M.

That's today. Looking further into the future, Raytheon has been selected by the U.S. Air Force as the follow-on producer for AMRAAM (Advanced Medium Range Air-to-Air Missile) that will play an

important role in U.S. and NATO air defense.

Bringing advanced technology to the ever-more-complex world of air-to-air combat is one of our particular skills. And we bring the same expertise to ground-based air defense systems like Hawk and Patriot, and to a broad array of radar, sonar, and electronic countermeasures systems for shipboard use.

For many years, European firms have participated in cooperative production of NATO Hawk and as members of the Raytheon-managed consortium established to develop and produce the NATO Seasparrow Missile System.

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RAYTHEON

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AEROSPACE IV

Growing civil use of helicopters

... the civil helicopter as a product in its own right still has not fully matured but is likely to do so over the next decade.

THE WORLD'S helicopter manufacturers are hoping that the next few years will see a significant upturn in the volume of business, with substantial growth expected in the civil sector, as more and more industries and individual customers become aware of the unique benefits that rotary-winged aircraft can offer.

The capabilities of near-vertical take-off and landing, and of hovering over one place for long periods of time, have already been amply demonstrated in military roles, and in such work as search and rescue. Even vertical or short take-off and landing fixed-wing aircraft cannot vie with this unique capability and an ever-widening range of uses for helicopters seems inevitable.

Forecasters by Sikorsky Aircraft of the U.S., a member of the United Technologies Group, and the world's biggest single helicopter manufacturer, suggest that in the decade 1983 to 1992 the world market for helicopters of all kinds, civil and military, is likely to amount to about 24,000 aircraft, worth

about \$36bn. This compares with deliveries in the decade 1973 to 1982 of about 19,000 aircraft, worth around \$20bn.

This market will be shared mainly between the eight major world helicopter manufacturers—Bell Helicopter Textron, Boeing Vertol, Hughes, Sikorsky, all of the U.S., and Aerospatiale of France, Agusta of Italy, Messerschmitt-Bölkow-Blohm of West Germany and Westland Helicopters of the UK. Supporting these are a number of smaller manufacturers—including Epiroc, Hiller, Kaman and Spitznagel in the U.S., and Kawasaki in Japan.

This increase of about 26 per cent overall will have the greatest impact in the civil market, where the share of the total will rise from 58 per cent in the past decade to about 63 per cent. This will reflect a growing demand from individual companies for helicopters for corporate and executive use, as well as a widening range of uses for helicopters in other commercial roles.

According to Mr David S. Lawrence, director of strategic planning for Sikorsky, these trends in turn will stem from the increasing efficiency of the helicopter as a transport vehicle, with greater comfort for passengers, improved styling, higher speed and increased safety—with a widening number of new designs specifically tailored to meet

civilian needs, instead of being adapted from original military specifications.

In Sikorsky's view, the civil helicopter as a product in its own right still has not fully matured, but is likely to do so over the next decade. The technology is still evolving—with improved engines and rotor systems, and increasing use of new, lightweight materials, so that tomorrow's helicopters will be significantly better than today's and next year's significantly better than this year's.

The original impetus to commercial helicopter development stemming from military requirements will fade, with the two design paths, civil and military, gradually diverging as specific civil requirements emerge, generating design solutions of their own. However, there will always be a measure of cross-fertilisation between the two, and it seems likely that many new technological developments will still be funded initially through their use in military programmes.

This improvement in civil helicopters is expected to be accompanied by increases in costs and selling prices of between 30 and 50 per cent, but it will also generate a wider variety of uses as commercial exploitation of the helicopter expands. Sikorsky believes that the smaller types of helicopter—that is up to about 6,000 lb gross weight (the lightweight

class) and between 6,000 lb and 15,000 lb (the intermediate class)—will be those most of interest to the commercial community.

Helicopters of 15,000 lb to 35,000 lb (the medium class) and those of upwards of 35,000 lb (the heavy class) are more likely to be needed either for military duties, or for very specialist civil work (such as logging or lifting other heavy loads), where the market will be limited.

Sikorsky believes that throughout the coming decade, the average annual rate of growth of helicopter manufacture and deliveries will run at about 5.5 per cent. The rates of growth will vary according to classes of helicopter.

In the lightweight class growth should average about 5 per cent, stimulated by growth of interest in the corporate and utility marketplaces, as the past interest in this category expressed by the offshore oil and gas support industries shifts towards the larger, twin-engine aircraft.

In the intermediate class growth should be higher, at about 7 per cent a year, with again the corporate sector showing most interest as industrial production generally improves after the recession and corporate profits rise. This growth in the intermediate class also takes into consideration an increasing interest in inter-city helicopter activities, and the growth of passenger



Restyled and improved to meet the needs of the market, the Westland 30 is already in service with British Airways Helicopters in North Sea operations.

transport links between urban areas and airports, especially in the U.S.

In the medium and heavy classes the predominant interest will be military, with only a comparatively small number of aircraft likely to be ordered for civilian purposes, so that the annual growth rate will be low. Another significant development is likely to be that most helicopters will be turbine-powered, rather than piston-engine powered, following the development of new turbine engines of greater fuel economy and increased reliability.

Recent developments in this field have included the new version of the Rolls-Royce Gem turbo-shaft engine (for the Italian Agusta A-129 Mangusta helicopter), while General Electric of the U.S. has been awarded a demonstrator engine

contract for a new 5,000 hp "modern technology" engine the GE-27, primarily for the U.S. Army's applied technology laboratory, but with obvious long-term commercial applications.

A further trend that is likely to intensify over the next few years is that of international collaboration in new helicopter development. Last year Sikorsky itself indicated its desire to share with new international partners the development of new technology in helicopters, and that aim stands.

Sikorsky has generated substantial business over the past years through licensing its designs to other helicopter manufacturers, for example in the UK and Italy and elsewhere. International collaboration in the world helicopter market is also evidenced by the West

WORLD HELICOPTER PRODUCTION (1983-92 forecast)

	Light (0-6,000 lb gross weight)	Intermediate (6-15,000 lb gross weight)	Medium/ Heavy (over 15,000 lb gross weight)	Total
Military	2,400	2,700	4,900	9,100
Civil	12,100	2,300	500	14,900
Total	14,500	5,000	5,400	24,900

Source: Sikorsky Aircraft (U.S.).

German (Messerschmitt-Bölkow-Blohm) programme with Kawasaki of Japan for the twin-engine HB-117 helicopter, while MBB is also working with Aerospatiale of France on plans for a new military anti-tank helicopter, the PAH-2/AC, intended to become available in the late 1980s.

But by far the largest international helicopter programme now under way is the British (Westland Helicopters) and Italian (Agusta) EH-101, to produce a large multi-role aircraft of over 31,000 lb gross take-off weight, designed by Agusta, General Electric T-700 turbo-shaft engines, and designed for a variety of roles, including a replacement for the current Sea King anti-submarine helicopter.

The plans envisage an eventual commercial version of the EH-101 from the start, however, so that the two versions can evolve side by side. As a civil aircraft it is envisaged that the EH-101 will carry up to 30 passengers.

The programme is being run by a new joint company, EH

Industries, which has been set up by Westland and Agusta. The objective is to fly the prototype in 1984-85, with production aircraft becoming available during 1988-89.

Nevertheless, the venture is being pressed ahead by the UK and Italian Governments and is likely eventually to be the biggest single helicopter development programme in western Europe, with ultimate production of several hundred aircraft and involving an investment in development and production of several hundred million pounds.

In the meantime, Westland is pushing ahead with the production of its Westland 30 civil helicopter, developed from the original Lynx multi-role airframe. Substantially re-styled and improved to meet the needs of the civil market, the 17-seat twin-turbine engine Westland 30 is already in service with British Airways Helicopters in the North Sea. It is also on order for a variety of other operators in the UK and U.S.

Michael Donne

Michael Donne outlines the steps the airlines must take to overcome their financial problems

Brake on investment

The airline industry argues that fare levels still lag perhaps as much as \$1bn behind the rises in fares needed to offset past rises in fuel costs alone.

THE MOST DIFFICULT challenge facing the airlines is likely to be finding the money with which to buy the new equipment that everyone agrees will be needed in the air transport industry through to the end of this century.

The heavy losses incurred by many airlines as a result of the recession, coupled with the very high cost of borrowed money, has resulted in an effective, although unwritten, "buying moratorium" by the airlines on new equipment, with the result that the aerospace manufacturers themselves have been obliged to slow down production rates substantially, and even in some companies to lay off labour in large numbers.

Figures compiled by the International Air Transport Association show that the current heavy burden of interest payments is the most serious problem confronting many airlines. In 1982, for example, the collective result for the IATA member airlines was an operating loss of only \$260m worldwide. But by the time interest payments of \$1.4bn were taken into account, the overall loss rose to \$1.57bn.

For the current year, the operating loss will be rather higher, estimated at about \$370m. But the burden of interest will rise to \$1.75bn, bringing the total industry deficit to about \$2.1bn.

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The banking community as a whole has been badly shaken by the heavy losses incurred by the airlines, especially in the U.S., in recent years, and by the demise of Laker and Braniff, not to mention a number of lesser-known operators in the U.S.

Some bankers are still fearful that before the recession ends, there may well be one or more further collapses of equal magnitude.

This is especially so in the U.S., where the unbridled "fare wars" that have been a consequence of deregulation, coupled with shortage of traffic, have brought many airlines to the brink of bankruptcy. Outside the U.S., the spectacle of what has been happening has frightened many governments and aviation agencies away from any ideas they might have had of encouraging deregulation and confirmed them in their belief that an evolutionary, rather than revolutionary approach to change is the best possible way forward.

Tight control

Those airlines which have been able to keep their finances under tight control and earn profits, albeit small ones, or which are supported by their governments (and the latter situation is the one most commonly prevailing throughout the world outside the U.S.), do not find it difficult to raise cash for new aircraft. The fact is that where banks and other lenders can be reasonably assured of an airline's long-term ability to pay, finance can be arranged.

The significant feature of most of these arrangements, however, is that they involve consortia of lenders. While individual financial institutions are sometimes prepared to be a sole source of finance for an airline, where the amount involved is comparatively small, the very large deals involving many millions (even hundreds of millions) of dollars invariably involve groups of lenders, with one or more "lead managers" who put the intricate arrangements together.

In this way, not only is the risk widely spread throughout the financial community, but also the share of the profits accruing over the deals is widely spread also. Contrary to general belief, the aerospace industry is currently one of the bank's biggest single customers, with a current outstanding liability of well over \$200m worldwide for aircraft either on order or recently delivered and still being paid for.

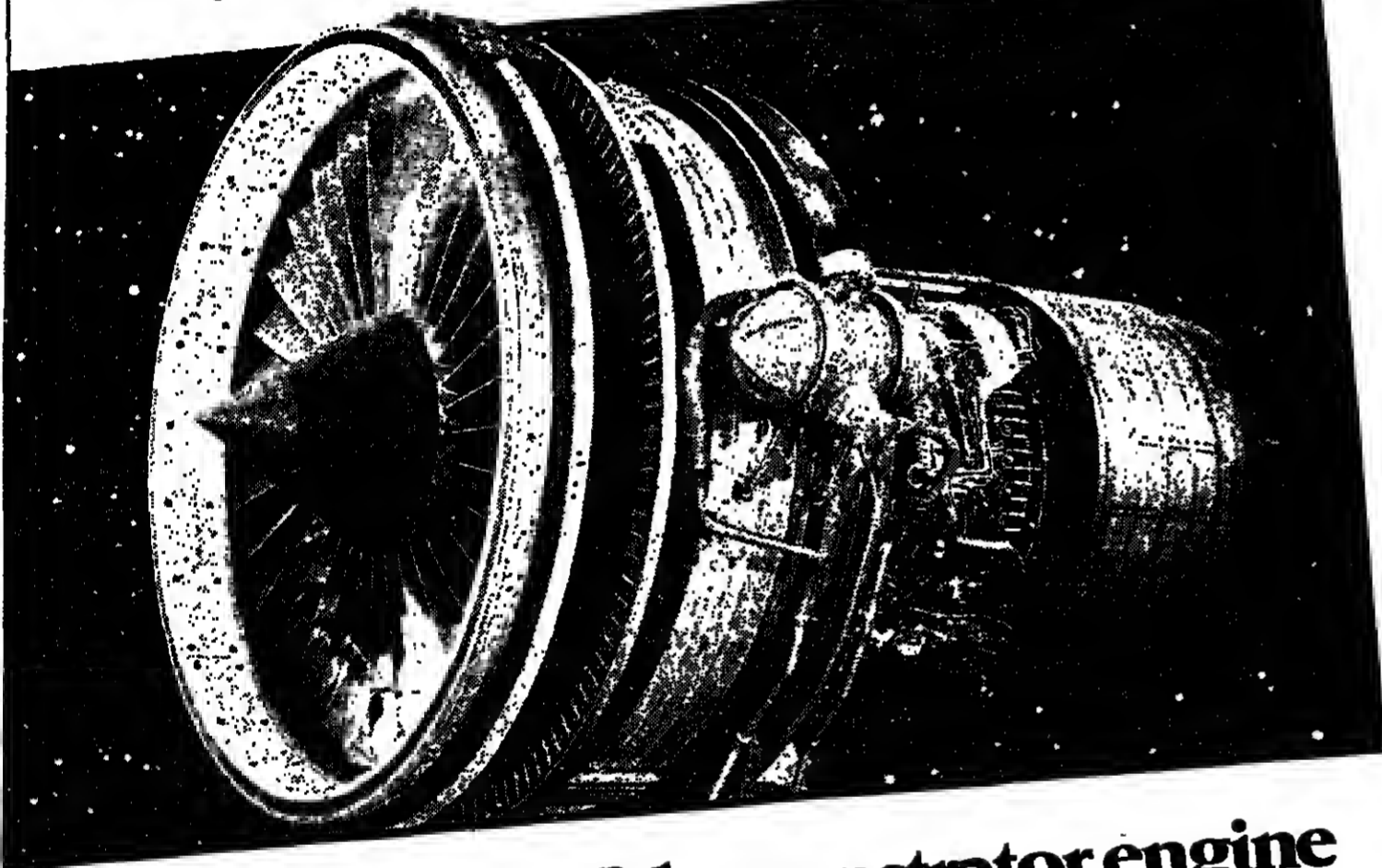
This figure seems likely to rise substantially in the remaining years of this decade, as the prospective outlay by the airlines on new aircraft expands, as they replace existing ageing fleets or move to meet new noise legislation, and to cope with prospective traffic growth.

Another element that has emerged in the provision of airline financing is a growing share taken by the manufacturers themselves. In many instances, airlines have been able to acquire new aircraft only because the manufacturers themselves have either lent them the money (thereby effectively subsidising the sale of their own products), or have been able to offer finance through prior arrangements of their own with lending institutions.

Which ever manufacturer can put together the best financial package seems likely to win the deal, since BA could comfortably operate either makers' aircraft on its routes.

All this is less simple than it sounds. In fact, the final decision emerges only many months of patient negotiation involving the airline, the manufacturer and the consortia of banks involved, in which virtually every minute detail of the airline's operations and its prospects is carefully weighed by the potential lenders, while the aircraft makers seek to improve their own products to help influence the final decision.

Aircraft engine innovations that bring technology to life:

Our E³ demonstrator engine is making time fly.

Through significant advances in aircraft engine technology, the Energy Efficient Engine (E³) project—co-directed by General Electric and NASA—is exceeding all objectives and has brought the future closer by several years. Test results at GE are demonstrating that the E³ is successfully providing an advanced technology base some of which is already being incorporated into development and production engines. And, more importantly, this technology can be applied to future gas turbine engines, starting now.

Fuel consumption tests alone clearly indicate just how great an impact E³ will have on aviation. The advanced GE technology in the E³ engine shows it can reduce fuel consumption by at least 8% compared to today's most efficient turbofan. For a typical major airline, this could mean annual fuel savings of \$11 million. And that's just the beginning.

In every area of technology, this E³ engine is a model of innovation. For example, lightweight blade containment, full authority digital electronic control (FADEC), low emissions combustor, and advanced cooling techniques. These and many more features in E³ are bringing the future of aircraft engines closer. In an industry where every minute counts, General Electric is helping to make time fly in the right direction.

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[illegible]

HUGHES AIRCRAFT COMPANY

AEROSPACE VI

Business aircraft hit by cuts in world demand

... the decline in demand for these aircraft ... was on a scale rarely experienced in the short history of the general aviation industry.

THE MARKET FOR business and general aviation aircraft in the U.S., the sector's biggest market, slumped dramatically last year in the face of high interest rates and a continued tightening of companies' budgets.

The industry in the U.S. acknowledges that trading conditions were difficult last year, but the manufacturers remain confident and optimistic about prospects especially in the light of moves towards lower interest rates.

Nevertheless, the decline in demand for these aircraft, from advanced business jets to simple single-engine aircraft for pleasure use, was on a scale rarely experienced in the short history of the general aviation industry.

Resilience

The deliveries of new business and general aviation aircraft fell over the year by over half to 4,266 aircraft, compared with 9,457 delivered in 1981. The sales value of these aircraft, at a total of \$1.99bn, fell less sharply, by 31.5 per cent, from the record sales of almost \$3bn in 1981, indicating some resilience in the demand for the higher price, but lower volume business jet and turboprop aircraft.

Industry forecasts for this year indicate delivery of 4,415 aircraft, from U.S. manufacturers, with a value of \$2bn, a slight improvement over last year.

This was acknowledged in a speech earlier this year by Mr Edward W. Stimpson, president of the General Aviation Manufacturers Association. "All segments of the market place were affected last year, but more complex and sophisticated aircraft were hit less," he told

members of the U.S. Aerospace Analysts Society.

Figures from the association underline the importance of jet and turboprop aircraft to the sector as a whole. In 1982, the U.S. business and general aviation industry delivered a total of 259 jet aircraft out of the total deliveries of 4,266 aircraft for the year. Yet these jets, mainly for business use, represented almost half the total sales value of all the general aviation aircraft sold last year.

The association has forecast that there will be a further decline in volume terms for sales of these jet aircraft this year, with an estimated 175 likely to be sold, valued at \$600m.

Demand for all types of business and general aviation aircraft is related closely to the performance of Gross National Product, and especially to spending on new plant and equipment, with many business aircraft purchased as a capital expenditure item.

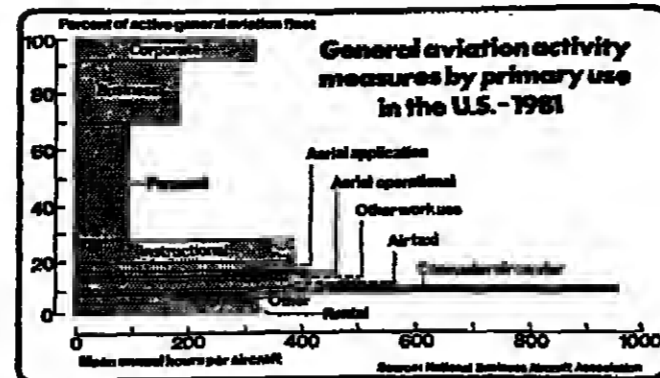
The General Aviation Manufacturers Association reports that sales of its categories of aircraft have paralleled new plant and equipment expenditure in the U.S. The association forecasts that increases in corporate spending in the U.S. later this year "should directly benefit business aviation sales."

Lower interest rates would also clearly help the industry, although it had been more resilient than other industries until interest rates reached 12 per cent. The first sector of the business and general aviation market to suffer was the market for single and multi-piston engine aircraft.

The impact of high interest rates on turboprop aircraft sales was marked in 1982, with deliveries down to 458 aircraft, about half the total number delivered the previous year.

The industry has forecast that up to 450 turboprops — with a market value of \$700m — are expected to be sold this year by U.S. manufacturers.

In the market for piston engine aircraft, where volumes are greater than in the jet and turboprop sectors but where unit prices are lower, the U.S. industry delivered 2,870 single-



engine aircraft and 680 twin-engine aircraft, a total in this category of 3,550 aircraft.

In comparison, the association has forecast a slight improvement in piston aircraft sales, with an estimated total of 3,780 aircraft expected to be delivered this year, 3,066 single-engine aircraft, and 725 twin-engine aircraft, with a total value of \$500m.

U.S. MANUFACTURERS' NET REVENUE FOR BUSINESS AND GENERAL AVIATION AIRCRAFT (Jan-Dec 1982)

	(\$m)
Ayres Corporation	4.9
Beech Aircraft	320.2
Cessna Aircraft	531.3
Fairchild Aircraft	87.6
Gates Learjet	438.8
Gulfstream American	446.4
Lake Aircraft	2.6
Maule Aircraft	1.9
Mooney Aircraft	N.A.
Piper Aircraft	178.9
Schweser Aircraft	2.3
Total	1,995

Source: General Aviation Manufacturers' Association (U.S.).

The industry in the U.S. is dominated by a few large companies and several smaller, more specialised manufacturers.

Cessna Aircraft dominated the industry last year with total sales of 2,140 business and general aviation aircraft worth \$531.3m. In value terms, Gulfstream American came second with total sales of \$446.4m from the delivery of 96 aircraft, reflecting the higher value of the company's range of aircraft.

In terms of sales volume, Piper Aircraft, specialising in producing an extensive range of smaller business and general aviation aircraft, came second with 1,049 aircraft sold last year, worth \$178.9m.

The U.S. business and general aviation industry also exports a substantial proportion of its output, although it by no means has the market to itself.

Last year, the U.S. manufacturers exported 27 per cent of its aircraft production, a third of its total sales by value. Exports this year are forecast to account for a quarter of sales in volume terms and 22 per cent by value.

In Europe, British Aerospace has a limited but successful range of business and general aviation aircraft. Its highly successful HS 125 executive jet is one of the best-selling aircraft in the company's range, with total sales to date of 553 aircraft. Of these, 80 per cent, valued at \$500m, have been sold in export markets. About 80 per cent of the exports have been to North America.

At the smaller end of the scale, BAe has its Jetstream 31 commuter aircraft, with ten air orders for the aircraft, including one, so far unnamed, customer in the U.S. The aircraft is to be presented by British Aerospace at the Paris Air Show in a new luxury executive version with between eight and nine seats compared with the more usual 18 to 19 seats in the aircraft's commuter airliner role.

Other manufacturers of business and general aviation aircraft in Europe include Aerospaciale in France, Dornier in W. Germany, Fokker in Holland and Rinaldo Piaggio and Aeritalia in Italy.

In Britain, business and general aviation operations are less well developed than in the U.S., although a total of over 6,700 aircraft in the category are registered in Britain, with about two-thirds used for private and business purposes. These aircraft use the 200 or so airfields in Britain and the 2,000 airfields in Continental Europe for day-to-day operations as well as the major airports.

These airfields give the operator of business aircraft one of the sector's great advantages over conventional, scheduled flights. Few population centres in Britain or on the Continent are far from a suitable airfield, and access is rapid and easy.

Lynton McLain

Growing number of leisure flyers

LEISURE FLYING, in all its forms, is becoming a substantial growth industry for manufacturers of light aircraft, gliders, hang-gliders, balloons and the new and often unconventional shapes of microlight aircraft.

It is estimated that as many as 50,000 people in Britain alone fly one or other of these machines for pleasure each year.

Flying fixed wing, powered aircraft is the most popular single category of leisure flying, with an estimated 20,000 or more qualified pilots holding private licences in Britain. Training for a licence to fly powered aircraft is expensive and can be time-consuming. Total costs will vary with the skill of the student pilot, but well over £1,000 is normal.

One approved scheme involves the student training with a minimum of 35 hours flying training at an approved flying school, all to be completed within six months. A more leisurely route is the CAA (Civil Aviation Authority)

authorised 40-hour flying course. This has the advantage for some students that it can be completed over any period of time.

Glidering is the second most popular form of leisure flying in Britain, with an estimated 11,000 active glider pilots in the country. These pilots fly from any one of the 100 or so clubs around Britain, most of them strategically placed to take advantage of geographical features such as long hill ridges which encourage the warm air thermals that glider pilots need for soaring.

Many of Britain's top glider pilots are expected to take part in the UK National Gliding Championship, to be held at Lasham Airfield, Hants, from July 23 to 31.

The event, sponsored by Marconi Avionics, probably will be the largest gathering of gliders at one site for 15 years, with 80 top pilots contesting the Open Class National championship. Carbon fibre and glass fibre are being used increasingly in the construction

of advanced gliders, and it is the use of these light and strong materials, combined with advanced aerodynamic designs, which gives some of the top gliders lift to drag ratios—the crucial performance feature of gliders—as high as 50:1.

The growing number of microlight aircraft provides the third category of aircraft for leisure flying. In the U.S., the Federal Aviation Administration has estimated that there are 33,000 of these low-cost "ultralight" aircraft flying, with steady growth predicted.

The Falcon single-seat, tail-first design from the U.S. Aerolite company won the top award at a recent convention for experimental and ultralight aircraft held in Florida. The aircraft, with its distinctive 28 hp engine and speed of up to 80 miles an hour, typifies the type of craft on the market for less than the price of a family saloon car—in this case, \$5,000 in kit form.

L. McL.

Signs of cargo demand reviving

Airlines and airport authorities are cautiously optimistic that the decline in demand for air cargo services has ended.

THE SUSTAINED slump in demand for air cargo services throughout the world over the past two years is showing tentative signs of easing as conditions for world trade in general improve in the light of lower interest rates.

At the same time, the vigorous cutting of freight rates prevalent from the start of last year has been replaced by a more stable regime of rates which are more comfortably above the cost of operating air cargo services.

Last year, some of these rates, especially over the once lucrative North Atlantic air routes, fell substantially below the minimum level necessary to provide the services.

Airlines operating on the North Atlantic routes estimate that it costs 21p to fly a kilogramme of freight from, say, London to New York. At the height of the rate-cutting war last year rates fell as low as 12p a kilogramme—"hopelessly uneconomic" according to some operators.

By the end of last year, a tacit agreement among the airlines resulted in air freight rates rising to the more stable levels of between 30 and 40p a kilogramme.

The industrial and commercial customers of the air cargo services, in general, have not rebelled against these rates, giving substance to thoughts that the worst of the recession so far as air cargo is concerned may well have passed.

Airlines and airport authorities are cautiously optimistic that the decline in demand for air cargo services has ended.

The cargo sector did not grow at all between 1979 and 1980 when 11m tonnes of freight were carried by world airlines according to the International Civil Aviation Organisation.

Between 1980 and 1981, the volume of air cargo declined substantially, by 2 per cent to 10.8m tonnes, although the activity in the air cargo sector, measured more comprehensively by tonne-kilometres, reflecting the tonnage and the distance carried, increased by 5 per cent to 20,160 tonne-kilometres.

This increase at a time of declining tonnage volume, indicates that the long-distance air cargo sector perhaps stood up more resiliently to the pressures of the recession than the short-haul business.

Between 1981 and 1982, very modest growth returned to the air cargo sector worldwide, with the ICAO reporting a growth of 1 per cent in the tonnage of freight airlifted, to 10.9m tonnes, according to preliminary estimates.

In Britain, the airlines operating air cargo services suffered more than airline worldwide, with the seven airports of the British Airports Authority reporting a total of 599,000 tonnes of air cargo lifted in exports and imports last year, a decline of 4.7 per cent on the previous year.

Suffered

Some of the BAA's airports suffered particularly badly, with Prestwick in Scotland, showing a 34 per cent decline to 11,700 tonnes. Glasgow showed a 4 per cent increase, at 12,400 tonnes.

In the south east of England, the country's major airports, at Heathrow and Gatwick, and the smaller Stansted, reported that a total of 566,000 tonnes of air cargo was handled last year, a decline of 4 per cent on 1981.

Of the world markets served by air cargo carriers operating out of airports run by the British Airports Authority, those to Africa showed the greatest decline last year, with a fall of just over 15 per cent to 67,900

tonnes. Traffic to and from continental Europe rose by 3 per cent to 167,000 tonnes, and air cargo traffic on UK domestic routes fell by 6.6 per cent to 28,100 tonnes.

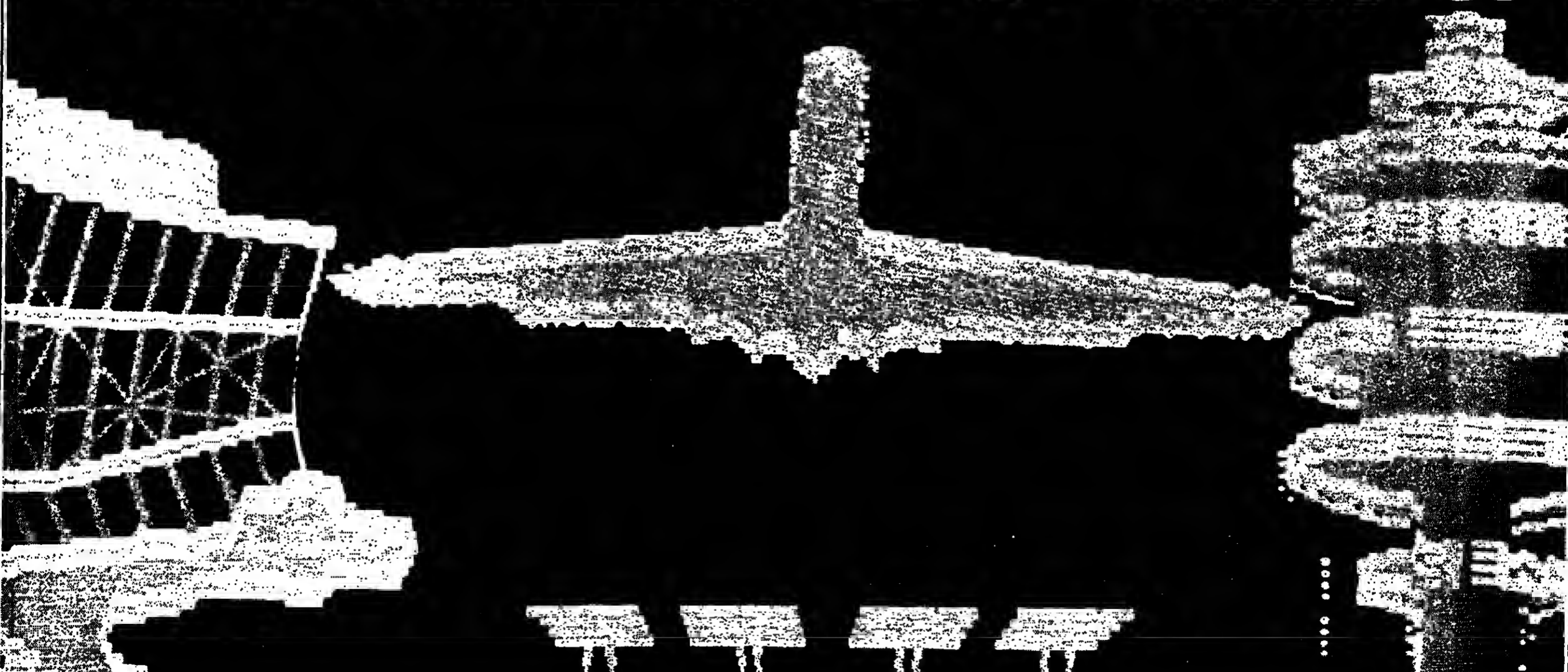
Nevertheless, despite the mixed fortunes of the UK air cargo industry last year, there are signs that the higher rates on the North Atlantic are likely to remain in force this year. British Airways quotes a rate of 46 pence a kilogramme for 500 kilogramme cargo loads on the London to New York route, higher than the rates charged last autumn and winter and indicative of the stronger demand for air freight services.

The airlines in general have cut back their air cargo capacity, with the specialised all-cargo aircraft operated by fewer of the scheduled carriers than in the past. These airlines have made strenuous efforts to consolidate more of their air cargo into the holds of their remaining passenger aircraft, in an attempt to maximise the use of resources.

This development has not prevented specialised all-cargo airlines from operating regular services with their specialised cargo-carrying aircraft. The U.S. airline, Boeing 747, the world's largest all-cargo carrier and is the world's largest operator of Boeing 747 and DC8 aircraft.

Lynton McLain

THOMSON-CSF THE POWER OF ELECTRONICS



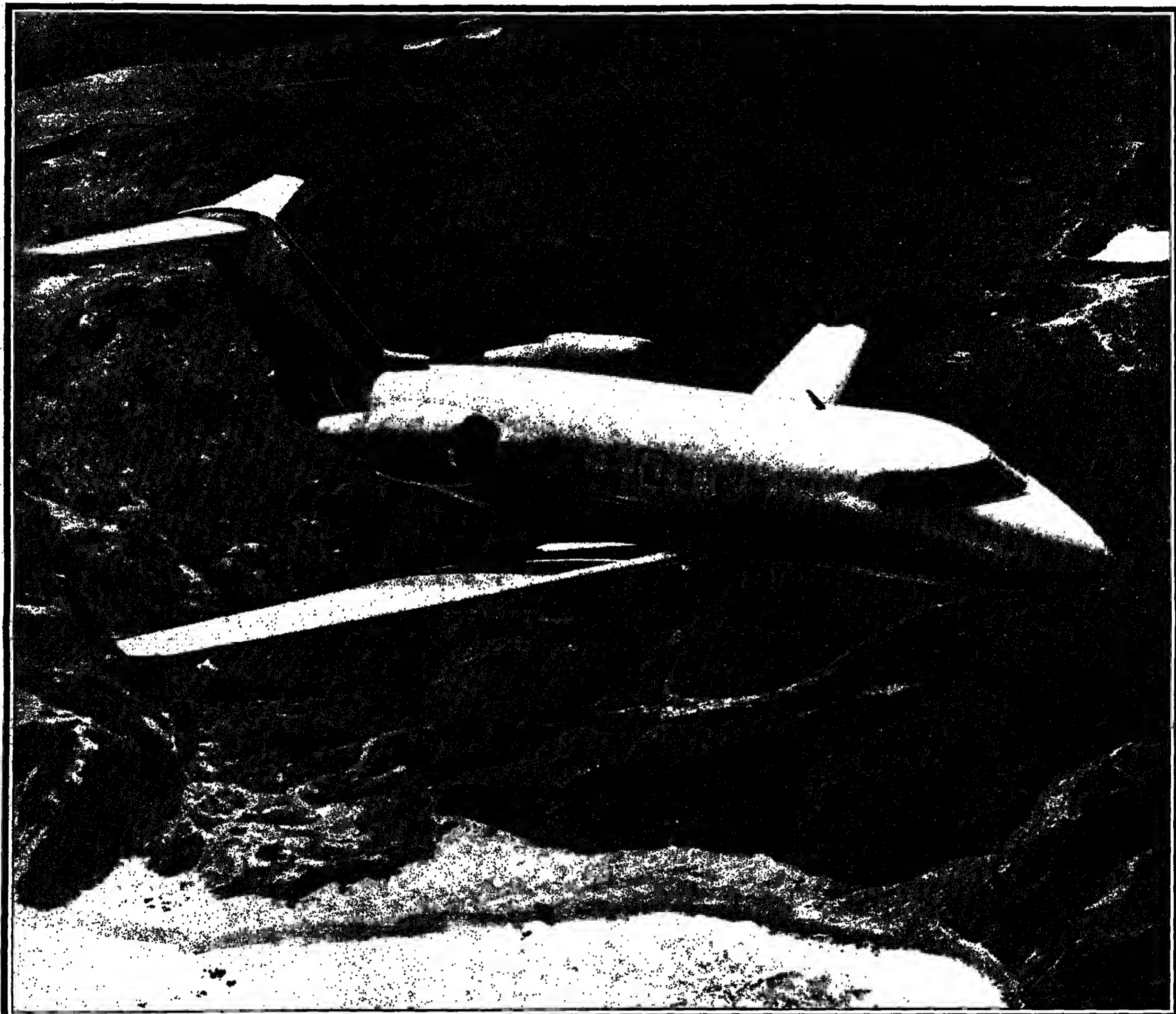
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AEROSPACE VIII

More ventures needed to fill factories

The UK

THE UK aerospace industry has been for some time a major exporter, generating a surplus on balance of payments account despite the heavy imports of foreign-built aircraft, especially commercial airliners.

During 1982, the UK industry as a whole exported over £3.11bn of its products, or more than 20 per cent greater than in 1981. Of this total, exports of aircraft and parts accounted for over £1.6bn while exports of engines and parts accounted for over £1.17bn.

All sections of this industry did well, however, with guided weapons exports amounting to more than £61m, instruments for over £152m and radio communications aids for close to £25m.

New ventures

A significant feature of the export statistics, however, is the high volume of parts and spares involved—over £1.15bn for aircraft parts and over £492m for engine parts. This reflects the influence of international collaborative programmes in which UK companies manufacture parts for joint ventures (wings for the European Airbus, for example), while it also reflects the way in which aircraft and engine ventures began some time earlier can continue to yield high incomes for many years.

But the export statistics also indicate that the industry needs new ventures, both military and civil, with which to fill its factories through the rest of this decade and through the 1990s. The number of "new aircraft" exported last year amounted to only £346m, or little more than 10 per cent of total exports, while "new engines" accounted for a rather higher proportion, at nearly £466m. It is hoped that as current new ventures—such as the British Aerospace 146 four-engine regional jet—build up sales, this situation will improve.

British Aerospace remains the much-pin around which the UK aerospace industry is concentrated, developing a wide range of civil aircraft from the BAe 146 four-engine regional airliner, through to the Jetstream 31 and BAe 748 twin-engine turbo-prop airliners

and the small BAe 125 twin-jet executive aircraft.

In addition, BAe has a 20 per cent stake in the European Airbus Industrie airliner manufacturing consortium for whose A-300 and A-310 twin-engine jet airliners BAe builds the wings, with plans also now being finalised for a probable participation by the UK group in wing production for the projected new A-320 150-seater version of the Airbus.

At the same time, BAe's involvement in military aviation remains strong, with production of the Anglo-West German Italian Tornado multi-role combat aircraft (of which eventually 809 are to be built) now running at a high level, alongside continued production of Jaguar jet strike-trainers for international markets.

Work on the UK share of the production of the AV-8B Harrier II, for both the U.S. Marine Corps and the RAF, is also now a major aspect of BAe's military activity, at its Kingston-Brough Division, as is production of the Hawk jet trainer and light tactical combat aircraft for both the RAF and overseas markets. A version of the Hawk has been selected by the U.S. Navy for its under-graduate jet flight training programme, the VTXTS.

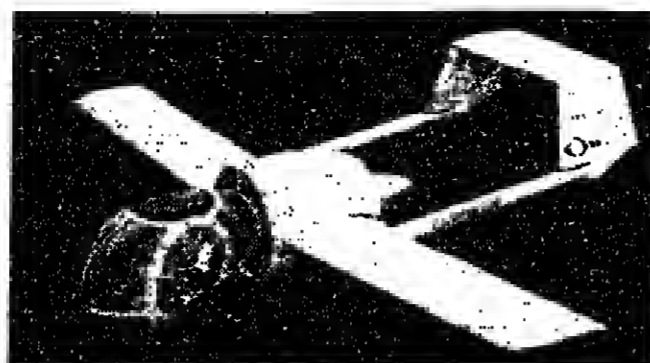
In space, too, BAe is developing an expanding business, through its Dynamics Group, especially in the development and production of satellites for communications and other duties, for the European Space Agency and other customers.

One of the most significant aspects of BAe's space work is the building of the Unisat communications satellite capable of about £120m, which will be the first commercial communications satellite, worth direct broadcasting transmissions from space into private homes.

The increasing volume of BAe's military missile business is discussed elsewhere in this survey.

The effect of all these activities during 1982 was to generate a 24 per cent increase in worldwide sales by BAe, with a profit before tax of £84.7m, 20 per cent up on 1981. Sales reached over £2bn, compared with over £1.6bn in 1981, and at the end of the year the order backlog amounted to over £4.22bn compared with £3.89bn at the end of 1981.

The group chairman, Sir Austin Pearce, in his review of 1982, made it clear that while space, missiles and military air-



The Edgley Optica, made by Edgley Aircraft, is now steadily winning acceptance at home and overseas

craft activities all did well, the weakest sector was civil aircraft, where demand was low as a result of the recession and competition worldwide was fierce. In view of the likely continuation of low demand for new airliners, as a result of the airlines' lack of enthusiasm for new jets, BAe has made a special provision of £100m in its 1982 accounts, to cover the continued cost of development and production of the 146 and other civil aircraft pending a revival of sales in an improved economic situation, and the need to cover BAe's own contributions to financing airline orders for Airbus and other aircraft.

To signify its confidence in the long-term future of civil aviation, BAe is not only preparing to participate in the development of a future European Airbus A-320 150-seater aircraft, but is also planning the development of a new, advanced, twin-engine turbo-prop powered airliner of its own, the Advanced Turbo-Prop (ATP), seating up to 64 passengers, which will complement the existing BAe 748 in world markets.

After British Aerospace, Short Brothers of Belfast is the largest fixed-wing aircraft manufacturer in the UK, with emphasis upon commuter airliners such as the twin-engine

30-seat SD-330 and the larger 36-seat SD-360.

Both of these aircraft are wide-bodied, and have sold well overseas as well as in the UK, especially in the U.S., where they have been much in demand from the commuter airlines. To date, more than 112 SD-330s have been sold, of which over 90 have been delivered, while orders and options for the 360 stand at over 46 aircraft, of which over ten have been delivered.

The smaller Skyvan, a short take-off and landing aircraft, which has been in production for several years, with over 150 sold, continues to sell well overseas, where it is employed in a wide range of civil and military roles.

Short Brothers, however, is more than just an aircraft builder. It has built up a substantial reputation in the "aerostuctures" business—the supply of parts for other manufacturers' aircraft.

One element of this is engine nacelles for large-thrust engines, in which Shorts claims to be the leading specialist in Western Europe. The company builds nacelle components for Rolls-Royce RB-211 engines installed on Boeing 747 Jumbo jets and Boeing 757s, while it also builds complete engine nacelles for the U.S. Avco-Lycoming engines jet used on the new BAe 146 airliner.

Other major aspects of the Short Brothers aerostuctures business include the risk-sharing partnership with Fokker of Holland covering wing design and production for the F-28 Fellowship airliner, and the manufacture of wing components for the Boeing 757, and landing gear doors for the Boeing 747.

Shorts is also substantially involved in the guided weapons industry, especially with its Blowpipe portable close-range guided missile, SeaCat close-range ship-borne anti-aircraft missile and its Tigercat land-based variant.

In addition to its main aircraft, aerostuctures and missile businesses, Shorts is involved in a number of allied projects, prominent among which are the flying services activities, which include the provision of maintenance and operational services for military and civil organisations.

In the smaller aircraft category, Pilatus Britten-Norman is active in the Isle of Wight, building the twin-engine Islander light transport with various versions on offer—

including the new turbine-Islander, and the Defender for military roles. Total deliveries by Pilatus Britten-Norman now stand at over 1,000 aircraft, with a substantial backlog on hand.

Also of significance for the UK industry's long-term future are the efforts of several manufacturers who are seeking to promote the expansion of small, light aircraft manufacture. One is Edgley Aircraft, which is building the small, three-seat observation aircraft, called the Optica.

This aircraft, which in design looks like a bulbous-eyed insect, can do it at 37 mph, with a stalling speed as low as 46 mph. It is ideal for any form of aerial work requiring slow, stable flying, and it has a range of 600 nautical miles.

Start up delayed

An initial production run of 200 aircraft is planned with firm orders in hand for 26 aircraft, and many more in negotiation at home and overseas.

Another new company is Fen Holdings, a U.S.-based company in Reno, in which the UK Government has a 5 per cent shareholding. The UK Government has pumped substantial cash into the company (over \$7m in grants, over £18m in loans and further substantial bank guarantees), to help the production of a turbo-prop aircraft called the Lear Fan, an executive machine making extensive use of carbon fibre in its construction.

Production start-up has been delayed, pending certification of the aircraft in the U.S. by the Federal Aviation Administration, but it is still hoped to get the project under way by late summer.

There are in addition several smaller companies active in the fixed-wing light aircraft manufacturing field. Aircraft Designs (Bembridge), of the Isle of Wight, is working on the Sheriff two to four light-weight training and utility aircraft, while NDN Aircraft, also of the Isle of Wight, is building the Firecracker two-seat training aircraft, with a turbo-prop version under way also, and an agricultural aircraft called the NDN-6 Fishmaster.

Slingby Aviation, of Kirby-Moorside, Yorkshire, is building under licence the French Fournier two-seat light aircraft, designated the T-67, which is intended to be available in several versions.

Michael Donne



Skyship 500, taking off at R.A.E. Cardington, near Bedford.

Airships boost in the UK

A BIG EFFORT to reawaken both public and commercial interest in the long-term potential of the airship is being made in the UK by the private-venture company, Airship Industries.

This company is involved in the design, manufacture and flight operation of a new generation of non-rigid airships which incorporate modern, lightweight, high-strength materials and many new design features.

The craft, now being developed by Airship Industries, uses non-combustible helium gas as the lifting agent—eliminating the dangers associated with the earlier airships which used the highly flammable hydrogen—and has "reacting propellers" to provide vertical take off and landing.

The first craft built by the company is the Skyship 500, which first flew in September 1981, and which has been performing successfully since in the UK and on the Continent, including last year's Farnborough Air Show.

A second Skyship 500 has been assembled in Canada where it flew a few weeks ago. It is to undertake trials this summer for the U.S. Navy—which has been an extensive user of non-rigid airships ("blimps") for escort and patrol work.

The Skyship 500 seats up to 13 passengers, and has a maximum speed of about 60 knots, with a disposable load of about 2 tons. A larger craft, the Skyship 600, seating up to 20 passengers, is now under development.

For the longer-term, the company is planning even larger craft, such as the Skyship 2000 seating up to 80 passengers and the Skyship 5000 seating nearly 200. How-

ever, these two latter ventures are still a long way ahead.

AI claims that there are many advantages for the modern airship compared with its fixed-wing and rotary-winged counterparts.

The primary benefits are that it is cheaper to operate, and does not require the vast expanses of modern airports to which to load and unload. Moreover, it is very quiet, causing none of the noise and pollution problems so often associated with other types of aircraft.

Another advantage is that it is comparatively slow-flying, so that it is potentially useful for a wide range of tasks that fixed-wing aircraft cannot perform because of their inability to fly slowly, or when rotary-winged aircraft cannot perform because of their comparatively high costs.

The airship, for example, is exceptionally valuable as a surveillance vehicle for military and civilian duties (the latter include police traffic, surveillance, tourist sightseeing, TV and radio platform, advertising, inspection of pipelines and other installations, fire-watching in forests and other areas, and search and rescue activities).

Airship Industries believes strongly, therefore, that there is a place for the airship in the current world aerospace scene. Its main task is to demonstrate this by not only continuing to fly the Skyship 500, and also the larger Skyship 600 later this summer, but also by winning orders from interested customers, and building up a strong background of safe, reliable and profitable operational experience.

M. D.

Balloon record bid

AN ATTEMPT to set a new world altitude record for hot air balloons is to be made in the UK this summer by Mr Mike Kendrick, managing director of Lighter Than Air, a hot air balloon and airship operator, and Mr Per Lindstrand, who heads his own balloon and airship manufacturing company, Colt Balloons.

The hot air balloon altitude record is 55,134 feet, but the two men aim to go much higher. The balloon and pilots' capsule have been specially designed by Mr Lindstrand, and in theory an altitude of about 100,000 feet is achievable. The venture, called Operation Sky Quest, is sponsored by the National Dairy Council and many other British companies.

The balloon itself will be

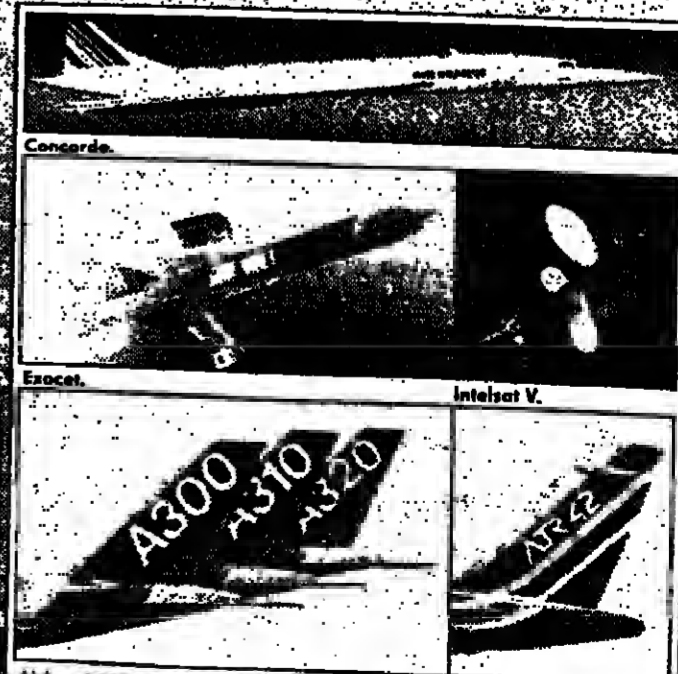
bullet-shaped, about 200 feet high and made of over 6,000 yards of Kevlar fabric. It will contain more than 400,000 cubic feet of air. To achieve the necessary lift, the air must be as hot as possible, within the limitations of the envelope fabric. To reach these high temperatures, the burner system will be the most powerful yet, including a secret new design development to enable it to burn at heights where the rarified air would not normally support combustion.

The crew's pressurised capsule will contain an on-board computer to co-ordinate information on weather conditions and to help in navigation and in communications with the ground. The launch probably will be in July.

M.D.

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AEROSPACE IX

Military orders acting as a prop

The U.S.

THE U.S. AEROSPACE industry is not exactly booming. But perhaps remarkably given the state of the airline industry, the profit figures coming out of the aerospace sector are not that bad either.

Last year the U.S. industry recorded sales of about \$63.3bn, down 6.7 per cent and the first decline in a decade. But the industry has adapted to the new climate.

Military orders undoubtedly have propped up the industry, staving off disaster for some companies and enabling others to post reasonably healthy full-year and first-quarter earnings figures, but other changes have been under way.

Costs, and in some cases workforces, have been cut, capital spending has been delayed or cancelled, debt ratios have been brought down, businesses have been diversified and, perhaps, most crucially, new financing methods to sell aircraft have been devised.

Lockheed hit the bullet in late 1981 and decided to halt production of the L1011, taking a \$25.70 a share write-off in the process. For McDonnell and Boeing, riding out the recession has proved only slightly more palatable.

The manufacturers serving the commercial airline market have had some of the toughest decisions to make over the last 18 months. The well-publicised airline failures like those of

Branch and Laker are symptomatic of the crisis which the airlines have been facing. With airlines such as Delta, Pan American, TWA, United and Eastern all reporting huge full-year and first-quarter losses, they have not been exactly bending over backwards to buy new aircraft.

Both Boeing and McDonnell Douglas remain committed to the commercial market, but they have paid the price in falling sales and operating losses on their commercial aircraft business.

Last year Boeing announced new orders for 110 jet transports worth \$2.3bn compared with orders the year before for 224 jets worth \$6.1bn. And McDonnell Douglas, in spite of boasting the highest sales of the year, the Super 80 with 48 seats, is a victim of a very depressed worldwide market, fared little better.

Commercial aircraft sales fell by almost a half from the previous year and the company recorded a \$45.8m loss on its commercial aircraft division. First-quarter sales at McDonnell were higher in all divisions except commercial aircraft, where sales fell by 15 per cent.

To cope with falling demand both McDonnell Douglas and Boeing have been forced to adopt a more flexible attitude to selling their jetliners.

Both McDonnell Douglas and Boeing have entered into deals recently involving them in buying back old aircraft from customers in order to win new orders. Boeing, under an eight-year leasing deal covering the sale of 33 737-200s to Delta, is

buying back 11 L-1011s and seven 727-300s.

McDonnell Douglas, which earlier this year wrapped up the biggest commercial aircraft deal ever with Alitalia, is buying back used jets from the Italian airline which has agreed to buy 30 Super 80 jets for \$1bn.

McDonnell has also spearheaded the most innovative financing packages in the market. In two separate deals at the end of last year the company offered TWA and American Airlines short-term operating leases on a total of 35 new Super 80s at very favourable terms. Those two orders helped push McDonnell's order book up to \$10bn at the end of the year.

McDonnell Douglas recognises the risks involved in such leasing packages and has said it will require \$700m in financing, but believes the packages were necessary to preserve production.

Alternative

The alternative, an unacceptable one at present for McDonnell Douglas, is to follow much of the rest of the industry into the arms of the Pentagon. Last year about 55 per cent of McDonnell's sales came from military aircraft

and another 18 per cent from spacecraft and missiles, and its current order book is about 90 per cent military.

The company, the main contractor for the controversial F15, would like to see a more balanced order book but believes it unlikely that it will ever again achieve the 50-50 split reached in 1978-1979.

At Boeing, which manufactures Minuteman missiles and does work on the MX, U.S. government sales represented 35 per cent of the total last year. At Northrop, a 40 per cent partner in the F15 and manufacturer of the F5 as well as a fuselage sub-contractor for the Boeing 747, the figure was 76 per cent. Grumman's sales came 79 per cent from the U.S. government.

General Dynamics, the largest U.S. defence contractor, which builds F-111 parts, the F-16 and the Tomahawk Cruise missile, received 88 per cent of its \$6.15bn sales last year from the U.S. government. As with the other main aerospace companies, the percentage of earnings derived from government business is even higher.

Military sales have been a major factor in the industry's survival, for

McDonnell has been able to keep the Long Beach DC-10 production line running only because of a \$2.7bn Pentagon order for 44 KC-10s, the military version of the commercial jet.

But that is not to say military business is without its risks. For example, both McDonnell Douglas and Northrop are acutely aware that the F15 programme, with 1,366 jets ordered, is still under attack in Congress.

Northrop, which decided to go-it-alone with the Tigerhawk jet designed to meet the requirements of "friendly" Third World nations, has yet to win a single firm order. It has spent more than \$447m in development and start-up production so far and is expected to spend another \$185m this year.

The heavier reliance of the U.S. aerospace industry on military spending has coincided with a more conservative approach to the massive risks in developing new commercial jets — an expensive game of crystal ball gazing which often appears to depend on reading the market 20 years ahead.

Boeing has pushed ahead with its two new jetliners, the 757 and 767, but, like McDonnell Douglas, has blown



The U.S. Lockheed TR-1 high-altitude single-seat reconnaissance and surveillance aircraft designed to provide all-weather information in both peace and war

PERFORMANCE OF U.S. AEROSPACE COMPANIES

	Sales 12 mths. 1982 (\$m)	% change from 1981	Earnings 12 mths. 1982 (\$m)	% change from 1981	Sales 1st qtr. 1983 (\$m)	% change from 1982	Earnings 1st qtr. 1983 (\$m)	% change from 1982
Boeing	9,035.0	-8	292.0	-38	2,989.0	+43	90.0	+48
General Dynamics	6,154.5	+29	160.5	+9	1,827.1	+47	56.8	+101
Grumman	2,656.7	+15	90.3	+22	509.1	+8	22.0	+139
Lockheed	5,613.0	+8	207.3	+34	1,415.8	+24	51.8	+38
Martin Marietta	3,526.5	+7	81.6	-54	801.9	+2	13.8	-13
McDonnell Douglas	7,331.3	-1	214.7	+22	2,074.9	+21	53.9	+24
Northrop	2,472.9	+24	5.4	-89	130.2	+48	7.3	n.e.
United Technologies	13,577.1	-1	426.9	-7	3,535.4	+10	110.1	+15

cool on prospects for the new 150-seater jet some airlines like Delta have urged.

Boeing is committed to spending \$10m a year on development of such a jet for the

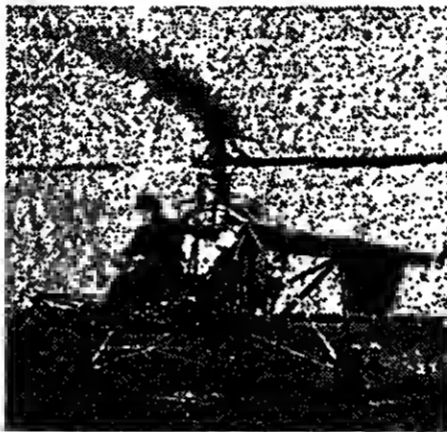
1990s and is also prepared to meet a challenge with a 737 derivative. McDonnell Douglas, on the other hand, believes its Super 80 and other DC-9 derivatives like the DC-9

which Alaska Airlines has just ordered, can stave off airline demand for a new jet "until the economics are right."

Paul Taylor

The First.

Igor Sikorsky flew the world's first practical helicopter on September 14, 1939. Today, Sikorsky, the company, is the largest helicopter manufacturer on earth.



VS-300

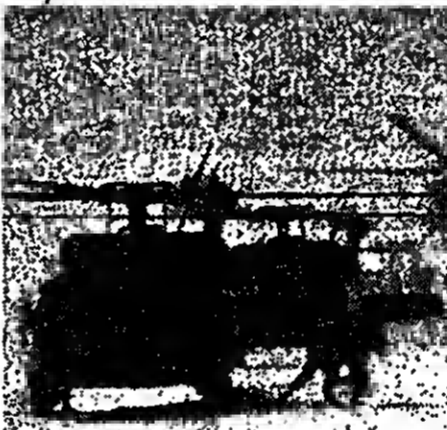
The Finest.

The Sikorsky H-60 series is the new standard of the U.S. Military. As Army BLACK HAWK, Navy SEAHAWK, and NIGHT HAWK, recently selected by the Air Force, this next-generation helicopter will serve both present and future multi-role requirements, including troop transport, logistics support, ASW, search and rescue.

Sikorsky's SUPERSTALLION H-53E is the Western World's largest heavy-lift helicopter, now being used by the U.S. Marines and Navy for any task requiring up to a 16-ton lift. The MH-53E will be used by the Navy as the next-generation airborne minesweeper.

The technology that produced these aircraft created the finest commercial helicopter in its class, the Sikorsky S-76 MARK II. The high level of maturity and acceptance achieved by this aircraft early in its evolution are the result of over 200,000 flight hours. In the tough offshore oil market, MARK II is delivering 95% availability, over 98% reliability. In the highly competitive corporate marketplace, MARK II is the most popular twin turbine helicopter.

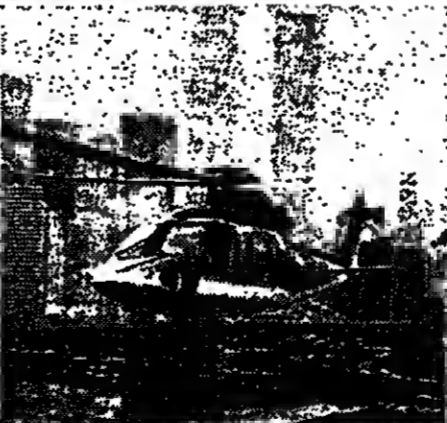
And in the AUH-76 military helicopter, Sikorsky has blended commercial and military expertise to create a multi-role aircraft destined for worldwide service.



BLACK HAWK



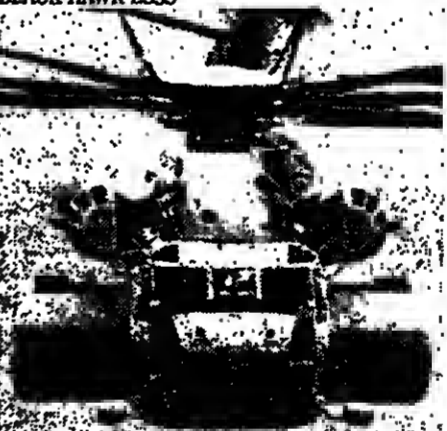
NIGHT HAWK



S-76 MARK II



BLACK HAWK ESS



MH-53E



S-76 MARK II



SEAHAWK



CH-53E



AUH-76

Exports aiding resilience

France

THE FRENCH aerospace industry has been feeling the pinch from the world recession, domestic defence cutbacks, and the financial difficulties of some client countries. But compared with the general malaise of the bulk of companies in the public sector, the mainly state-owned aerospace companies have shown evidence of healthy resilience in the last two difficult years.

The main bolster against misfortune has come from exports — especially from military orders, which make up about two-thirds of all foreign sales.

With the civil aviation market depressed by the economic slump and the financial difficulties of world airlines, Airbus sales have been hit hard — although as the French-led consortium (and the Paris government) never tire of pointing out, it has done better than its main competitors Boeing and McDonnell Douglas.

More than ever, then, military favourites have been making the running. Technical data on the Mirage 2000 and Super Etendard jets and the Exocet missile (which both became well known during the Falklands war) are now essential items in the glossary of commercial phrases which French Ministers take with them on trips to countries in the Middle East or Asia.

Both the two main state-run aerospace companies, Aerospatiale (with a turnover of about FF21bn (\$2.9bn) and a workforce of 35,000) and Dassault-Breguet (turnover FF13bn, workforce of 16,000) have recently taken measures to adapt production to falling demand. The aerospace sector as a whole, with a workforce of 118,000, has been an important creator of jobs in recent years, but now faces leaner times.

Partner

Aerospatiale, which as well as being the main partner in the Airbus consortium, also makes helicopters, missiles (not only Exocet, but also ballistic missiles for the "force de frappe") and rockets (including the European space launcher Ariane), has been hit particularly by a dramatic cut in helicopter orders on the U.S. market. The company's profit last year is believed to have been well down from the FF400m in 1981.

Dassault makes Mirage jet fighters as well as the Super Etendard and the Falcon executive jets. Although export orders for the Mirage 2000 and

F1 have stood up well — among others, from India, Peru, Egypt and Iraq — the company has been affected by a cancellation of French Air Force orders and the downturn in civil sales.

Matra, the diversified arms and electronics group, owned 51 per cent by the state, is still chalking up profits from its missile sector. But like Aerospatiale, Matra has achieved sales of satellites below expectations, mainly because of heavy competition from the U.S. on world markets.

To face up to the problem of "Franco-rench" competition between the two companies to win foreign customers, the Paris Government is proposing that Aerospatiale and Matra pool their sales efforts for satellites and enter into other kinds of industrial collaboration — a step which the companies up to now are resisting.

Turnover of the whole French aerospace sector last year rose 19 per cent (well ahead of the roughly 10 per cent inflation rate) to FF252bn, according to preliminary estimates from the industry grouping, CIPAS.

Showing the overwhelming importance of export sales, foreign orders climbed 26 per cent to FF44bn, with foreign deliveries rising 23 per cent to FF33bn.

The industry has a net foreign trade surplus of about FF23bn, putting it in the forefront of the country's currency earners.

The problems facing the Airbus consortium were underlined in January when Gen Jacques Mitterrand, chairman of Aerospatiale, warned in a memorandum leaked to the Press that the Airbus programme was "preoccupying" The Airbus Industrie chairman, M Bernard Lathiere, promptly hit back by saying that Gen Mitterrand's remarks represented a present worth millions to Boeing, and pointed out that with orders of about 130 aircraft in hand, the consortium still had enough work for 24 years.

Gen Mitterrand — who retires from Aerospatiale this month on his 65th birthday — is particularly worried about the lack of a European decision so far on the plan for a new 150-seater Airbus A-320.

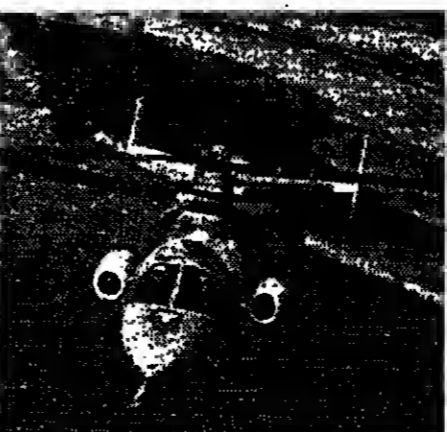
Apart from the programme with Italy to build jointly the ATR 42 regional airliner, few new projects are on the horizon in either the aviation or the space sector (where important details over future development of the Ariane range still have to be decided). This is a big cloud hanging over the companies' research and development teams.

David Marsh

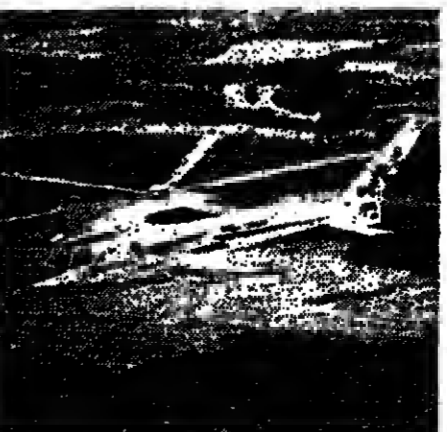
The Future.

Sikorsky's Advancing Blade Concept (ABC) research helicopter is the fastest in the world. The Rotor System Research Aircraft (RSRA) is already testing 21st century rotor technology.

This commitment to the future is backed by the strengths of Sikorsky's parent, United Technologies Corporation, and their investment in research and development which totaled over \$825 million in 1982.



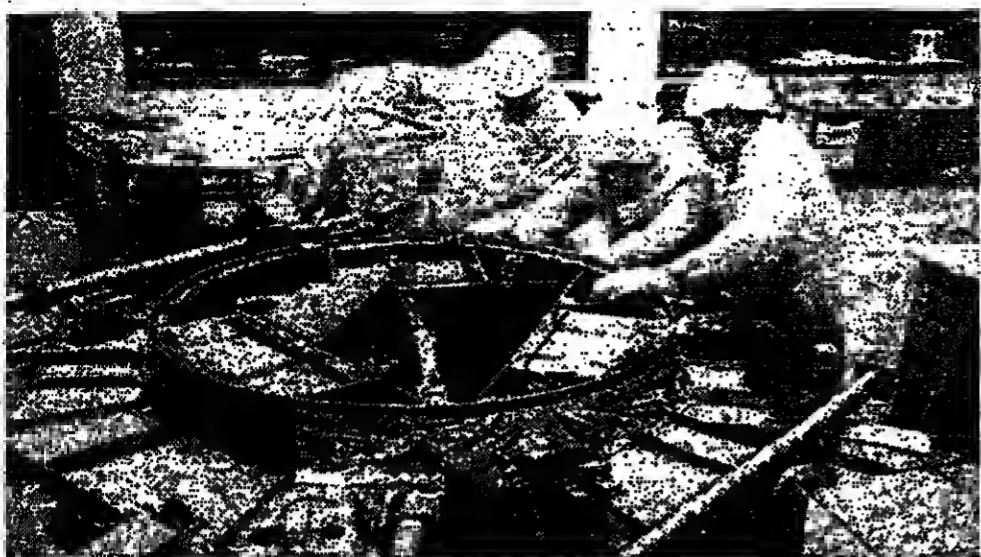
ABC



RSRA

Sikorsky. The Leader.

AEROSPACE XI



Sweden's first satellite during tests in Saab-Scania's integration hall in Linköping

JAS project is largest ever defence contract

Sweden

FOUR YEARS AGO, the Swedish aerospace industry had neither a continuing military construction programme nor a commercial one; but the climate has changed.

Last year, the industry won an order for Sweden's next combat aircraft, code-named JAS 39, a consortium partner between SAAB-Scania and Fairchild Industries of the U.S. has flown its first regional airliner, the twin turbo-prop SF 340, with deliveries due to start next spring. Sweden is also preparing to move ahead on a Nordic telecommunications satellite known as Tele-X; and its Viking space research satellite is completing final testing at the European Space Agency.

The JAS project is the largest defence contract ever placed with Swedish industry. It calls for delivery before the year 2000 of between 130 and 140 aircraft with weaponry and equipment. Total value is SKr 24.5bn (\$4.3bn) at 1981 prices. The operating life of JAS is planned to extend well into the next century.

An initial SKr 10bn contract for production of the first 30 aircraft was awarded by the Swedish Defence Materials Procurement Agency to a special aerospace industry group headed by SAAB-Scania last June.

The decision to proceed was pushed through Parliament last year despite opposition by the Social Democrats, who were sympathetic to concerns that the aircraft might become obsolete within its operational lifetime. Once in power, they gave their stamp of approval following an investigation which dispelled lingering doubts.

However, the programme's

cost was reduced by SKr 800m to the original estimate, and Parliament has insisted on strict adherence to budget targets. The June 30 contract spells out penalties if the single-engine aircraft fails to meet performance, operating and maintenance standards. Mr Anders Thornberg, the Defence Minister, stated in recent Parliamentary discussion that it might be necessary to delay purchase of about 10 aircraft to stay within target.

The JAS programme was chosen against competing American proposals. It has saved SAAB-Scania's ability to design and produce its own military aircraft, as well as 6,000 of 15,000 jobs in the aerospace industry.

Systems

The JAS Industry Group includes SAAB-Scania which is responsible for about two-thirds of the work. It will handle the airframe construction and systems integration. Volvo Flygmotor is co-producing the F-404 engine, which powers the F-18 Hornet, with General Electric of the U.S. The Ericsson Telecommunications group is producing the radar, sensor equipment, target acquisition systems and cockpit displays.

The aircraft has been designed to carry out attack, intercept and reconnaissance missions. Like its predecessors, the Viggen and Draken, it is built for simple maintenance, but is less dependent on ground support and equipment.

To avoid a rush development programme, SAAB-Scania signed a contract with British Aerospace last December. BAe will design and produce the lead-bearing section of the wings to be used on the four prototypes. SAAB will take over during production build-up in the early 1990s.

When the predecessor to the current JAS development programme was cancelled by the Government in 1979, the SAAB Board resolved to cut its dependence on military contracts. The result was the SAAB-Fairchild joint venture for the 24-seat SF-340 regional airliner.

The first prototype made its maiden flight from Linköping, Sweden, this January, exactly three years after the programme was initiated. A second aircraft is joining the test schedule in May and a third in August.

This the first airliner designed to meet both U.S. and European standards, according to officials who hope that it will receive simultaneous certification when it reaches 1,000 hours of flight testing. Deliveries of the first 30 aircraft are planned for soon afterwards, in spring 1984.

The SAAB-Fairchild group has set up a finance company with Citibank as the lead bank, and a new marketing arm. It announced the loss of 10 orders in the U.S. late last year due to poor economic conditions, and has re-estimated its firm orders at 100 aircraft.

With an anticipated uptake, officials hope the SF-340 will be able to capture a sizeable share of a market estimated at between 1,500 and 2,000 aircraft by the year 2000. The break-even point is 200 aircraft at \$5m each at 1982 prices.

On the space technology side, the Swedish Parliament is expected to approve a Bill allocating funds for a Nordic telecommunications satellite project known as Tele-X. Initial start-up funds would be SKr 575m, with an estimated total project cost of SKr 1.3bn to be shared with Norway and possibly Finland.

David Brown

Difficult year ahead

Italy

ITALY'S AEROSPACE manufacturers are now coming to terms with an unanticipated circumstance: that 1983 is likely to be a difficult year for the industry.

Until now, aerospace has been one of the quieter, but nonetheless genuine, success stories in an industrial landscape dotted by such disasters as steel and chemicals, both regularly losing hundreds of billions of lire annually.

The aerospace sector's total turnover has climbed from L7,400m (\$507m) in 1977 to L2,300m for 1981, of which three-quarters went for export. Final figures for 1982 have not yet been prepared, but a further substantial growth is likely to have been achieved, again largely generated abroad.

This year, however, may well see problems, especially from summer onwards. The reasons are familiar: the acute financial difficulties of civil airlines (which have already been cutting back orders), the shortage of available finance for potential buyers from developing countries and the serious resources of oil producer nations, are leading them to slow down their expansion programmes.

All this, however, is for the future. The results thus far reported for 1982 by Italy's major aerospace manufacturers suggest that the upturn, until then, continued. Aeritalia, the country's leading producer and a subsidiary of the huge IRI-Finmeccanica state-owned conglomerate, announced that sales had risen by 12 per cent to L500bn (\$570m) and that net profits would be double the L2.2bn achieved in 1981. Orders in hand at the end of last year stood at L1,550bn (\$1,070bn).

Aermacchi, the smaller Varese-based concern, of which Aeritalia now holds 23 per cent, reported a comparable advance in turnover to L1,583bn (\$1,261m), and earnings of "several billion lire." A healthy expansion in sales is also expected from

Agusta, the second-ranking company in the sector, controlled by EFIM, another state-controlled industrial holding company.

The activities of the aerospace sector are of a breadth reflecting the profound change it has experienced since the mid-1970s. Italy's manufacturers are no longer specialists, concerned with marginal and basically small-scale programmes. Today, they are key participants in several of the largest international projects under way—in both the military and civilian fields.

The most eye-catching military programme is, of course, the Anglo-German-Italian multi-role Tornado strike aircraft, in which Aeritalia is the Italian partner, and of which 100 have been ordered by the Italian Air Force. But considerable hopes are pinned on the new AMX light attack and battlefield support aircraft, being developed by Macchi, Aeritalia and Embraer of Brazil.

Test flight

Already the air forces of the two countries have placed orders for 266 of the aircraft, to be priced at between \$8m and \$10m each. The first test flight of the AMX is due by the end of this year, and the main concern of the manufacturers is less technological than whether the Italian Parliament (now dissolved ahead of the June 1983 general election) will approve disbursement of the L470bn of Government funds allocated for the AMX.

Such apprehensions indeed illustrate one of the perennial problems faced by the industry—the bureaucratic obstacles inherent in Italy's rusty administrative machinery. Failure of promised official help to materialise has led frequently in the past to a heavy reliance on expensive borrowing from banks, and the ensuing burden of high debt servicing charges.

Agusta, of course, is heavily involved itself on the military side, especially in helicopters. Final agreement on the project to build a new range of helicopters, the EH-101, in conjunction with Westland of Britain,

is expected shortly. In the meantime, its subsidiary, Sial-Marelli, is promoting its S-211 military light trainer.

The most striking civil involvement remains Aeritalia's important role in the Boeing 767 programme, which is likely to be a backbone of the company's activities for several years. But progress on the ATR-42 short haul "commuter" aircraft, on which it is co-operating with Aerospaziale, its French opposite number, is also running smoothly and ahead of schedule.

However, increasing importance has brought with it increasing responsibilities and pressures, both at home and abroad. An example of the latter has been the campaign mounted by France to enlist Italian support for the A-320, the planned entry of Airbus Industrie, the multi-national European consortium into the competition for the new generation of 150-seat airliners.

At home, too, the success of the aerospace industry has focused attention on the need to reorganise its structure. A first step was the acquisition by Aeritalia of a minority interest in Aermacchi. Far more important is the future relationship between Aeritalia and Agusta. Last year, Sig Giammi de Michelis, the outgoing Minister for State shareholdings outlined a plan to effectively merge the two by the transfer of control of Agusta from EFIM to IRI. But the scheme seemed somewhat improbable from the outset, above all because of the rivalry between the two companies and their two parents.

EFIM, in particular, would be unhappy to lose perhaps the best asset it has. After a capital increase from L150m to L115bn, EFIM's share of the capital of Agusta rose from 51 per cent to 60 per cent. The remainder is in the hands of the founding Agusta family, which in fact would like to sell out.

Whatever happens, some form of truce between the two companies is required—if only to remove wasteful competition between them.

Rupert Cornwell

Industry hopes for bright future

Israel

THE SUCCESSES of the Israeli Air Force in the Lebanese war against Syrian aircraft and ground defences, and the recent U.S. decision to release sophisticated technology for incorporation in the new Lavi fighter, have raised hopes for a bright future for Israel's aerospace industry.

Inquiries about such items as the Israeli-made pilotless drones and electronic warfare equipment have brought new orders which, it is hoped, will help the aerospace and allied industries recoup some of the losses of last year.

Israeli Aircraft Industries (IAI) dominates the business and is also the country's biggest company in terms of sales, exports and number of employees. Among its 350 products is the Kfir jet fighter which performed creditably as a ground attack aircraft in the Lebanese war. The latest in the Kfir line is the CF with improved performance and upgraded avionics.

However, despite persistent reports of pending deals to sell the Kfir to one country or another, the latest being Honduras, there is no confirmation that any of these deals has been agreed.

After a particularly good year in 1981-82 when total sales reached a record \$822m and exports grew to \$517m, the company's financial report for 1982-1983 is expected to show almost a 10 per cent decline in sales and exports as compared with the 50 per cent of total sales.

One of the first actions of Israel's new Defence Minister, Professor Moshe Arens, a former deputy Director-General and head of the engineering department at IAI, on taking over in February was to announce that the \$210m for Lavi development this year will be provided out of the defence budget.

Willing

Development of the Mach 1.8 Lavi, whose first flight is scheduled for the end of 1985, gives a much needed boost to IAI which, without this project, would have faced a gradual decline in size with the winding down of Kfir production in the coming years.

The Israeli Air Force is willing to take 300 Lavis which is expected to provide employment for 12,000 people. Looking remarkably like the F-16, but with canards, the Lavi's primary function will be close and medium range air-to-ground missions with a secondary air defence role.

Beth Shemesh engines, originally set up by Turbomeca, is already tooling up to produce the Pratt and Whitney FWH120 engine which will power the Lavi. Like IAI, which wanted the engine too, this contract probably saved Beth Shemesh from an increasingly perilous future.

The recession in the West which hit the business aircraft market, also spelt bad news for IAI's Westwind executive jet whose sales fell last year. But the company is more optimistic about its new generation Westwind Astra which is due to roll out of the hangar in September this year, and go into production in 1985. Already it has orders for 20 Astras, mainly from buyers of the earlier Westwind models.

Israel's Arava Stal aircraft has still failed to live up to marketing expectations, even though about 60 of them are already operating in central and southern America. IAI is still pursuing sales for this aircraft, but there are considerable doubts that it will ever return its development and production costs.

IAI reports deliveries of the Scout to a number of customers, including some European countries, as a result of the interest generated by its war successes. Because of its fibreglass construction the Scout has almost no radar signature.

The highly-successful Gabriel sea-to-sea missile has now been joined by an air-to-sea version and IAI has also improved its Barak Naval Point defence missile with a vertical launch version which takes up minimum space on a ship's deck.

The Gabriel, which is already in service with the Argentine Navy, may also make a breakthrough into the Brazilian market, though there are reports that the Brazilian Foreign Ministry has voiced objections to the Navy's desire to buy the Israeli weapon.

A new Israeli-made air-to-air missile, Python 3, which brought down several aircraft in the Lebanon war, was unveiled this year by Rafael, the Defence Ministry's armaments development authority. The heat-seeking, super-sensitive infra-red detector of the Python allows it to be fired from "practically any" direction, according to Rafael Director Mr Zeev Boneh.

David Lennon

Three words that almost cover the earth

MACRODYNE-SOVAM INTERNATIONAL

Those three words stretch across five continents. They make up the name of a new joint venture between Macrodyne Industries of the United States and Sovam S.A. of France.

MSI now offers airlines and airports the broadest range of ground support equipment from any company, anywhere.

The equipment is presently manufactured in France and will also be manufactured in the U.S. by Macrodyne Industries Inc. It is now being used at over fifty airports throughout the world, under all climatic conditions.

All of it is rugged; able to stand up to demanding airport use. Mechanical systems are easily accessible. The body is made

of modular, removable sections for easy replacement. Electrical systems are based on solid-state, plug-in circuits for quick repair. All in all, it's designed to be—and has proven to be—efficient and economical to operate.

The most unusual feature of the equipment is the broad backup from MSI. Dual warranties. Comprehensive, on-site training. Service and maintenance programs. Long or short term leases. Full financing plans. Turn-key packages. Round-the-clock technical assistance. Quickly available spare parts.

Macrodyne-Sovam International. Three words worth storing in your memory for when you need ground support equipment.

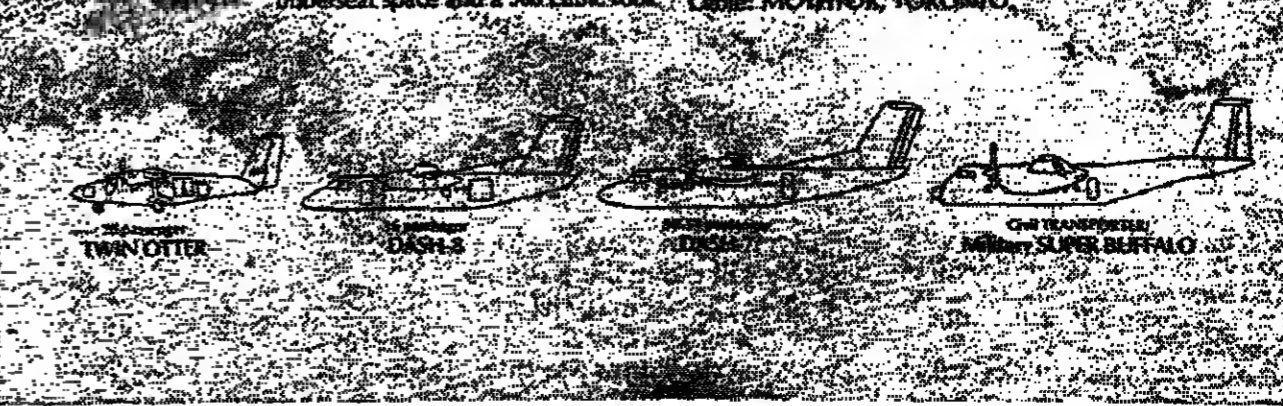
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deHAVILLAND

The standard De Havilland twin-engine turboprop aircraft, the DHC-6 Twin Otter, is a versatile aircraft with a wide range of applications. It is used for passenger transport, cargo transport, and as a utility aircraft. The DHC-6 is a low-wing, high-wing aircraft with a fixed landing gear. It has a maximum speed of 250 knots and a range of 1,000 miles. It is a very reliable and durable aircraft, and it is easy to maintain. The DHC-6 is a very popular aircraft, and it is used in many different parts of the world.



AEROSPACE XIV

Airlines struggle with big losses

The fear is that if fuel costs do decline significantly, government pressures to reduce fares may be increased just when a breathing space is needed.

THE WORLD'S airlines are still passing through the worst recession in their history. Losses incurred by the air transport industry as a whole during 1982 amounted to about \$2bn, bringing total losses for the period from 1977 to \$5.7bn, with further substantial losses forecast for the current year (leading to over-capacity on many air routes with too many seats available for too few passengers), high interest rates and high inflation.

Although there are signs of an upturn in the world economic situation, and many in the airline industry are

hoping that this will start to be reflected in its results later this year, it is likely to be some considerable time before the industry can pay off the overall losses of more than \$5bn that will have accumulated between 1979 and the end of 1984.

Most of the losses already incurred or in prospect stem from the very high interest payments on loans for new equipment taken out by the airlines over the past few years, both to replace ageing fleets and to meet an anticipated growth that in the event has not occurred.

The airlines' difficult financial situation has also been compounded by a number of other major problems, apart from slack or zero traffic growth (leading to over-capacity on many air routes with too many seats available for too few passengers), high interest rates and high inflation.

These factors include the blocked or delayed transfer

from some countries, especially in Africa, of airlines' earnings in those areas, which now amount to an estimated \$1bn.

Another has been the loss of the part of governments to subsidise large losses to enable the airlines to recoup on rising costs, especially fuel costs. In some cases there has been severe pressure by some governments on airlines to actually reduce fares to meet consumers' demands for cheaper air travel.

The current decline in crude oil prices is already resulting in a stabilisation of aviation fuel prices, and many in the airline industry hope that a period of declining aviation fuel costs may now be in the offing, although it is recognised that this may not be of very great magnitude, or last very long—the overall long-term trend in fuel prices being likely to continue upwards.

The fear though is that if fuel costs do decline significantly, government pressures on the airlines to reduce their fares may be increased correspondingly, at a time when the industry needs a breathing space to allow it to catch up with and redress its heavy losses. The airline industry argues that fare levels still lag perhaps as much as \$1bn behind the rises in fares needed to offset past rises in fuel costs alone.

But there are some other problems that have been largely of the airlines' own making. One is the practice known as "discounting"—offering air tickets at prices well below the officially prevailing rates agreed either in inter-governmental negotiations or through the

normal fares-fixing machinery of the International Air Transport Association itself. One estimate has put the cost of discounting to the airline industry at over \$1bn a year—revenues that should have accrued to the industry but which are totally lost.

Monitoring

While strong efforts are now being made to stamp out this practice—by means of a tighter policing of their own activities by the airlines themselves through the IATA's own "Fare Deal Monitoring Group"—progress is slow, and it may be some time before the industry can even reduce the practice to manageable proportions.

In many parts of the world, discounting has become almost a way of life for some airlines, and even their governments, and since many airlines are not members of the IATA, it is necessary to get governments to agree to help stamp it out.

This is already proving extremely difficult although there have been some successes, especially in the Far East and Middle East, and the efforts are continuing.

If discounting, costing over \$1bn a year, can be substantially cut down, if not eliminated, and if much of the \$1bn of foreign earnings now blocked could be released, much of the industry's current financial problem could be eased.

But there remain other difficulties which are likely to prove much more intractable. One is the industry's propensity

in some parts of the world to indulge in "fares wars," which achieve little in the way of traffic growth but bleed the participating airlines dry—in some cases almost to death, as the bankruptcy of Braniff in the U.S. and Laker in the UK have demonstrated.

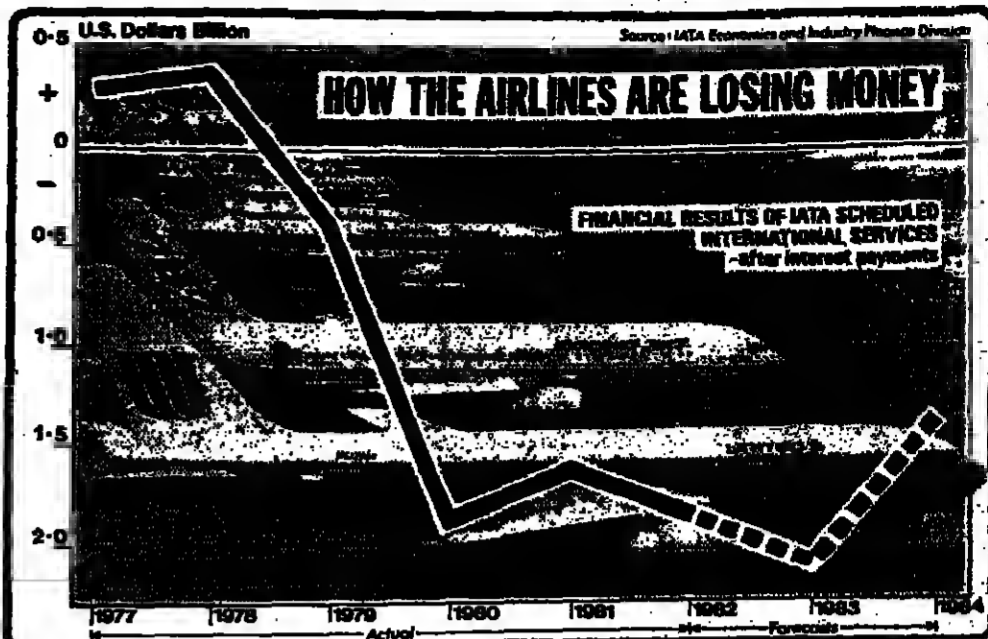
The present battles in the U.S. for traffic on virtually all air routes, as a result of deregulation which has removed government controls on fares policies and because of the volume of competition on the routes, have already resulted in losses of many hundreds of millions of dollars in 1982, with equally heavy losses likely in 1983.

On international air routes, government controls remain in force, and the fares battles tend to be smaller in scale, but their effects can be severely debilitating to the airlines' revenues and profits.

This has already been demonstrated on the North Atlantic. It is estimated that in 1982, with close to 50 airlines—both scheduled and charter—flying the North Atlantic between Western Europe and North America, cumulative losses amounted to more than \$600m.

There is not likely to be much improvement in the current year, with further fares cuts likely this summer, as new "cut price" airlines such as People Express are launched on to the route. The U.S. Government to engage in such discussions.

One further problem already arising from all these factors is that the airlines are finding it difficult, if not impossible, to



raise the cash they need to re-equip their fleets with new jets to replace their existing ageing and increasingly fuel inefficient fleets.

It has been estimated that the airlines are not likely to return to profitability until either 1984 or 1985 at the earliest, and that they will need to earn profits of well over \$3bn in 1983 alone to meet actual (aircraft already ordered) or potential re-equipment costs. It seems likely, therefore, that even with the ending of the recession, the airlines will remain in a serious financial situation for a long time to come.

How then do the airlines, on the Atlantic routes and elsewhere, climb out of their difficulties? There are several methods, all of which are being tried in one form or another, but many of which could be pursued with considerably greater vigour than at present.

In the first place, the airlines themselves must continue to do all they can, with the aid of their governments, to halt the blood-letting of discounting air fares. They must also press their governments to do all they can to end the blocking of the transfers of legitimate earnings from foreign countries. Those two actions alone would do much to correct the current financial woes of the airline industry.

Beyond that, they must also seek to reduce the over-capacity that is wasting so much of the industry's strength. This is admittedly exceptionally difficult on some routes, such as the North Atlantic, but it is much easier elsewhere, especially in Western Europe, where extensive bilateral agreements govern much of the air transport operations.

But probably far more significant

in the long-term is the need for most airlines to undertake the same kind of severe slimming operations that have been undertaken in the past two years or so by such airlines as British Airways and Pan American.

At the same time, many airlines will need to repolish their image to improve their passenger reliability and quality of service both in the air and on the ground. The long period of exceptional prosperity and extremely high annual rates of growth (10 to 12 per cent) of the pre-recession period undoubtedly generated in the world airline industry an atmosphere of complacency, which led to mounting criticism of the quality of service, while leaving the airlines highly vulnerable to the impact of the recession.

Shock

It is difficult to assess the degree of shock which the current recession, with all its problems, has given the industry as a whole, and to individual airlines, but it is clear to people who fly every day that there is still much to be done.

Safety has never been compromised, and remains exceptionally high. But there is still the need for improved punctuality and reliability, for greater skill in ground handling (still the number one complaint worldwide for most air travellers), and a greater awareness on the part of governments and their agencies (such as Customs and Immigration, airports authorities and others), that air travel is no longer a luxury for the few, but a social, economic and even political necessity to modern life.

Michael Donne

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Airport business expected to rise

Future developments in the densely-populated countries are likely to be expansions and adaptations of existing airports, bitterly debated by lobbyists and environmentalists.

UPWARDS OF \$800m is expected to be spent on airport ground facilities by the end of this century, to adapt airports, air traffic control and ancillary services such as fire services and other emergency services to cope with the anticipated volume of traffic that will follow the end of the recession.

The general belief is that the current annual total of 765m scheduled service passengers worldwide will double by the early 1990s, if not before, and that throughout the 1990s, it is likely to double again.

This means that by the end of the century, well over 2bn scheduled service passengers a year will be travelling by air throughout the world, and that if the unmeasured number of non-scheduled passengers is also included, the figure could be as high as 3bn.

Finding ground-room for all these travellers is likely to pose some major difficulties for airports' authorities and governments worldwide.

One illustration of the problem is available in the current debate in the UK into whether

or not a third major airport for London should be located at an expanded Stansted Airport, in Essex, or at a new site, local authority owned airports to cope with anticipated traffic expansion.

Indeed, it is probably impossible to list all the various airport development, improvement and expansion programmes now under way, for there is hardly an existing airport in the world at which some work is not going on to cope with traffic growth, either actual or potential.

Moreover, it is also almost impossible to list all the various places where new airport developments will become necessary in the years ahead, especially if the current economic recession ends soon, and air traffic resumes its pre-recession upsurge in growth.

Because of the sums involved—Terminal Four at Heathrow is costing more than £170m, and Terminal Two at Gatwick over £150m, and these are small sums compared with those being spent on the new Riyadh and Jeddah airports in Saudi Arabia—the business of providing airports is intensely competitive. Not only are existing airport authorities such as the British Airports Authority and the Paris and Frankfurt airport authorities—already involved in selling worldwide their expertise in designing, building and running airports, but also many major commercial groups are involved.

Engineering

In the UK, Plessey Airports, part of the Plessey Group, the General Electric Company, International Aeradio and Cable and Wireless, are all involved in the provision of technical knowledge, and practical engineering and other facilities, for the development of airports in many parts of the world.

This is significant, because in many countries with a limited knowledge of air transport affairs, it is necessary to be able to provide a complete package system for aviation development, covering not only the entire design, development, financing and construction of a new civil airport, together with its operation at least for a limited time after its completion, but often also advice on the development and operation of the flag airline of the country concerned.

Thus, there has emerged the concept of a "package" or turnkey operation, with consortia of companies linked in one overall airport (and sometimes also airline) development concept, often resulting in close links with the country concerned for many years.

The value of these individual contracts is exceptionally high—in some cases running into several hundred million pounds—and as a result they are fiercely contested, while for the winning consortium the results often lead on to other business in the same country.

Even a \$500m bill for the development of a major airport appears relatively cheap if all aspects of the work are taken into account, from basic civil engineering through to the provision of equipment and facilities for daily operation.

In all probability, IATA's estimate of \$800m is rather on the low side. To generate this cash will be a major problem for governments, airport authorities and the air transport industry overall through the rest of this century, and it seems likely that much of it eventually will have to be paid for by the passenger, through levies on ticket sales.

Decisions

In these countries, all future airport developments are likely to be expansions or adaptations of existing airports, and even those will be the subject of bitterly-contested debate between environmentalists and air transport lobbyists, frequently solved only by direct government intervention, with decisions that probably will never entirely satisfy anyone.

In most of the emerging countries of the Third World, however, this kind of problem either does not exist, or has yet to develop into the major environmental issue that has been found in the industrialised and highly-developed countries. It is significant, therefore, that most of the estimated outlay of \$800m on new airport developments up to the end of this century is to be found in the Third World.

A recent list of major world airport projects prepared by the National Westminster Bank, detailing more than 30 major programmes worldwide involving outlays of more than \$20m, included only four outside the developing world, of which three were in the UK (one at Fife, one at Gatwick and one in the Docklands area of London), and one in the U.S.

The list did not include the possible development of either Stansted or a Terminal Five at Heathrow, because that is not yet settled. Nor did it mention the very large number of programmes now under way throughout the UK at provincial

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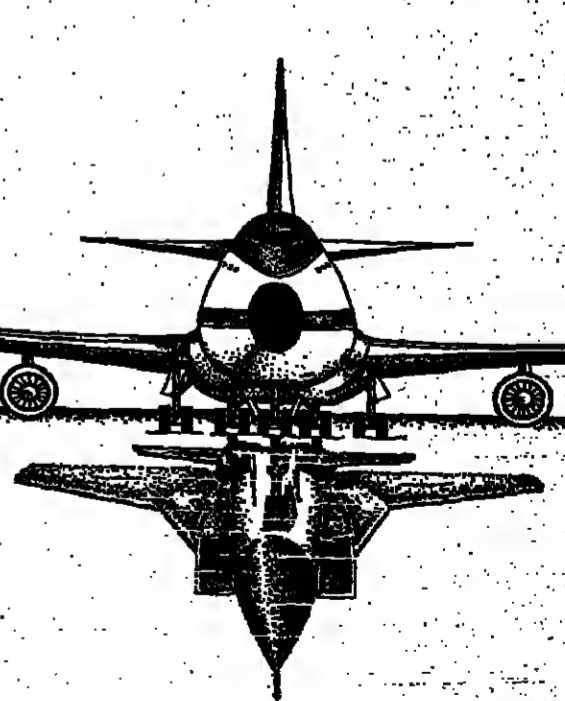
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M. D.

AEROSPACE XVI

Space technology expanding rapidly

Between now and the end of this century at least another 200 to 300 commercial satellites of various kinds will be put into Earth orbit.

WHILE A substantial part of the world aerospace industry has been suffering from the recession, one area—that of space—has been expanding at a dramatic pace. Although the era of space technology is little more than 25 years old, it has evolved rapidly from the first Soviet Sputnik satellite of 1957 through to the highly complex manned reusable space transport system of today, NASA's Shuttle, that is capable of carrying into space and launching satellites on its own.

While military space development covers satellites for defence communications and other purposes, and is largely secret, civil and commercial space technology covers several broad fields in its own right: deep space probes that are designed to discover more about the solar system and about the Earth's space environment; scientific satellites that are intended to discover more about the near-Earth environment; and "applications satellites" that are intended to put space technology to work. Examples include telecommunications, weather forecasting, Earth resources monitoring and many other ways.

Activity in all these fields has been expanding. By the end of 1982, there were still more than 4,800 spacecraft of various types in orbit, of which about 4,750 were in Earth orbit, 16 were in orbit round the moon and 36 in solar or inter-planetary orbit.

Of these, in turn, the U.S. was responsible for about 2,780, and the Soviet Union for 1,815. Of course, many more spacecraft than these have been launched over the past 25 years or so, but many have either malfunctioned, or completed their duties and fallen silent, while still in space, or burned up on re-entering the Earth's atmosphere at the end of their missions.

The current average annual rate of spacecraft launches of all kinds runs to about 50 worldwide, if military spacecraft are included (the numbers are not clear, for many of such launches are never publicised), but the total of commercial

spacecraft is much lower, although it is now expanding annually.

Most of the latter are satellites for communications (still the biggest single function for near-Earth satellites), followed by weather forecasting and Earth resources monitoring—a now rapidly expanding field in its own right.

It is estimated that between now and the end of this century, at least another 200 to 300 commercial satellites of various kinds will be put into Earth orbit—mostly for communications of one kind or another (including the new arena of "direct broadcasting satellites"), but also including many for Earth resources monitoring—at an estimated outlay of at least \$60n.

If the essential ground-based facilities for these satellites are also taken into account, the overall anticipated spending on commercial space activities through the next 17 years is likely to be more in the region of \$200n to \$300n.

Competitive

Space has thus already become big business, and is expected to become even bigger. At the same time, it is also becoming ever more fiercely competitive, as more and more companies in more and more countries vie with each other for the business available in both the space and ground hardware.

Prospects for the increasing commercialisation of space have been considerably enhanced as a result of the development in the US of the manned, reusable Space Shuttle System (STS), generally known as the Shuttle.

The system is already beginning to show that in time, it will become an invaluable means of launching satellites of all kinds, and other payloads, into space, and will help considerably to bring closer the day of constructing manned space stations in permanent orbit round the Earth, with parts flown up by a series of Shuttle launches.

Already President Reagan has called for a study into the possible development of a permanently-based, manned space station, which would help the U.S. to retain its lead in space activities. The study is expected to consider not only technological, but also the political, sociological and defence implications of such a manned station, together with details of costs of development and maintenance and whether inter-

national support in its development should be sought.

The results of the study, to be carried out by the Senior Inter-Agency Group for Space in the U.S., are due to become available this autumn.

In the meantime, however, it is becoming clear that the time-scales for Shuttle launches originally laid down are taking much longer to implement than expected. At one time, NASA had hoped to achieve Shuttle launches at a rate of about one every two weeks, using both the Cape Kennedy, Florida, and Vandenberg, California, launching bases.

In the event, because of technical delays, the turn-around times for the Shuttle have been longer than planned, although it must be admitted that in the early developmental phases of such a complex and expensive system it is better to be safe than sorry.

It is recognised by NASA that these turn-around times must be substantially improved, without in any way prejudicing the safety of astronauts, vehicles or payloads, before the Shuttle can become commercially viable.

Much work is now being done in the U.S., not only by NASA, but throughout the aerospace industry which has designed, developed and built all the myriad parts of the intricate Shuttle system, to improve the system and help achieve as soon as possible the target of commercial reliability and hence also viability.

No one doubts that the target eventually will be achieved, and that before the end of this decade Shuttle launches will have become a regular feature of U.S. space activity. The only question is how long it will take. Even now, however, the U.S. is planning a rising schedule of Shuttle launches, and a rate of 10 to 12 a year by the later 1980s does not seem an impossible ambition, rising rapidly thereafter through the 1990s.

In the meantime, a heavy reliance is still placed by prospective commercial and other customers on the use of conventional rocket launchers to put their satellites into orbit, with a reluctance by some to commit their expensive payloads to the Shuttle (a view shared by the insurance market which has found past satellite launching failures an exceptionally expensive risk).

Last year, for example, despite the successful launch of two commercial communications satellites from Shuttle

STS-5 in November, marking the start of operational use of the Shuttle, there were still 11 successful launches by conventional rockets, mainly of commercial and international communications satellites.

Similarly, in 1983, although a further four launches of the Shuttle (STS-7, 8, 9 and 10) are planned, there will be 17 unmanned rocket launches, many of them carrying commercial communications and other satellite payloads although some scientific satellites are also involved.

Similarly, in Western Europe development of the conventional Ariane rocket launcher vehicle, has had its difficulties, with the failure of the L-5 launch last autumn. As a result, the European Space Agency has now revised its programme, with L-6 now set for launch in early June, to be followed later in the year by L-7 in August, L-8 in November, and L-9 next January.

Of these, L-6 will launch the European Communications Satellite (ECS) and the Amstar (Radio Amateur Telecommunications Satellite). The L-7, L-8 and L-9 launchers have been assigned to the launching of the big Intelsat V satellites for the International Telecommunications Satellite Organisation.

But even the European Space Agency has found it difficult to fit all of its launch commitments into the rearranged schedule, and the European X-ray Observation Satellite, Exosat, will be launched by a U.S. Thor-Delta rocket from the U.S. Vandenberg base in late May, this year. Following this programme, the L-10 Ariane will be the first launch of the more powerful rocket, capable of injecting two spacecraft, each of up to 1,100 kilograms, into geostationary transfer orbit.

Trends

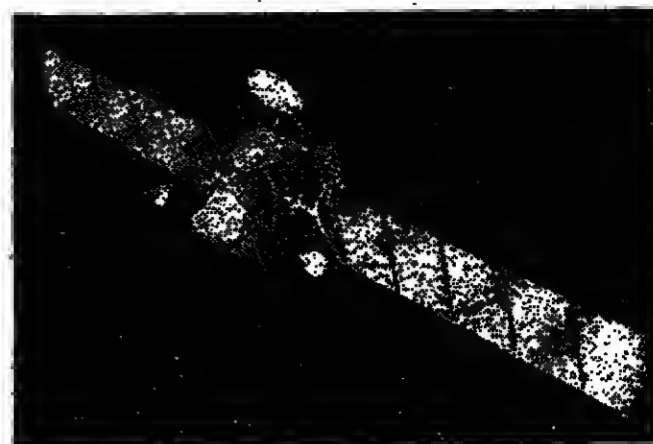
It is intended that the European Space Agency's ECS-2 and the Mares B-2 communications satellites, together with the French satellites Telecom 1A and B, and the Arab League's satellite, Arabsat-1, as well as the U.S. commercial satellites, Western Union's Westar-4 and Southern Pacific's Spacestar-1 and 2, will all be launched in the near future by the Ariane 3. Because trends will require the launching of even bigger payloads from the mid-1980s on, the European Space Agency is now developing a more powerful version still of the Ariane, the Series 4. This will become available in several versions, capable of putting payloads of between

2,000 and 4,300 kilograms into Earth transfer orbit.

This flexibility of launch vehicle availability will enable a wider variety of payloads to be accommodated, keeping the "occupancy rate" of the launcher at a high level. The first test launch of an Ariane 4 is expected in the second half of 1985, and it should be operational from 1986 onwards, with among its likely first payloads the very large Intelsat VI series of communications satellites.

At the same time, to speed the launching rate of Ariane rockets, and cater for the bigger versions of the Ariane now on the way, the European Space Agency is building a second launching platform at the present launching base at Kourou in French Guiana. This will enable one Ariane to be readied for launch while another is being sent off into space, and it is expected that this will reduce the intervals between launches to one month.

This improved launching rate will become necessary because the revised schedule now drawn up for Ariane envisages a total of nearly 20 launches up to the end of 1985, putting nearly 40 separate payloads into Earth orbit, of which the majority will be communications satellites of



Artist's impression of UNISAT, the broadcasting satellite for the UK which will provide two channels of television programmes direct to homes.

one kind or another.

Conscious of the need to compete with the Shuttle, by providing a viable alternative launching system for those countries or commercial customers who for one reason or another do not wish to use the U.S. facilities, the European Space Agency is now studying what to do beyond Ariane 4.

A new engine, using liquid oxygen and liquid hydrogen, and giving 80 tonnes of thrust, has been selected as a key element in the future launch system, but

the possible launcher configurations themselves are still being studied.

The possibilities include an even bigger Ariane, using the 90-tonne thrust engine that would be able to put payloads of up to 15 tonnes into low orbit round the earth by 1992, as well as launchers that, in the longer term, could be partially or even totally recovered once fired, as parts of the Shuttle system are recoverable now.

Michael Donne

Military satellites gather intelligence in secret war

THE MILITARY uses of space have been exploited since the first Sputnik was launched over a quarter of a century ago, on October 4, 1957. Both the U.S. and the Soviet Union have made and still make extensive use of satellites, primarily for communications or surveillance purposes, and many of the satellites that are launched for military purposes are either not publicised, or if so, their precise tasks in Earth orbit are never revealed.

Many of the planned launches of the new U.S. Space Shuttle system through the 1980s are intended to carry payloads for the Department of Defence, primarily satellites for a wide range of tasks—communications, surveillance, missile tracking and other purposes.

These roles include photographic reconnaissance, nuclear blast detection, electronic intelligence gathering, navigational aids for military

aircraft and ships, military weather forecasting, and extensive aerial mapping. So far as is known, neither the U.S. nor the Soviet Union have yet actually resorted to the deployment of weapons aboard spacecraft, but the longer-term eventual possibilities of such activities cannot be ignored.

Even without such use of spacecraft as weapons platforms, however, it is clear that in any future hostilities, the enemy's spacecraft must be prime targets if only because of the communications, surveillance and other "non-shooting" but nonetheless vital uses to which they are put. The development of techniques to detect those uses is thus a vital element in the continued escalation of the military uses of space.

Some time ago, the U.S. Air Force set up a Space Command to take over all the military activities evolving from the exploitation of this

new frontier of technology, and in the recent past its activities have been substantially extended.

Among its current studies are plans for the eventual development of a "space-to-space" reconnaissance system, to detect hostile satellites from start to finish, and a warning laser receiver for U.S. military satellites; and evasive manoeuvring techniques for satellites and other spacecraft.

Although little has been published about their activities in the West, it is believed that Soviet satellite scientists are working along similar lines, as Mr Caspar Weinberger, U.S. Defence Secretary, said recently in his report on Soviet military power.

Mr Weinberger's report suggested that the Soviet Union could launch the first prototype of a space-based anti-satellite laser system in the late 1980s or early 1990s,

while an operational system, capable of attacking other satellites within a few thousand km range could be established in the early 1990s.

On the other hand, space-based anti-ballistic missile systems would be more difficult and expensive to develop, but could be tested in the 1990s, probably becoming operational around the turn of the century.

The Soviet Union is known to be building bigger and more powerful rocket vehicles that could give it the capability of deploying large weapons systems in near-Earth orbit, although it has not yet developed a system approaching the U.S. Space Shuttle manned, reusable space transport system.

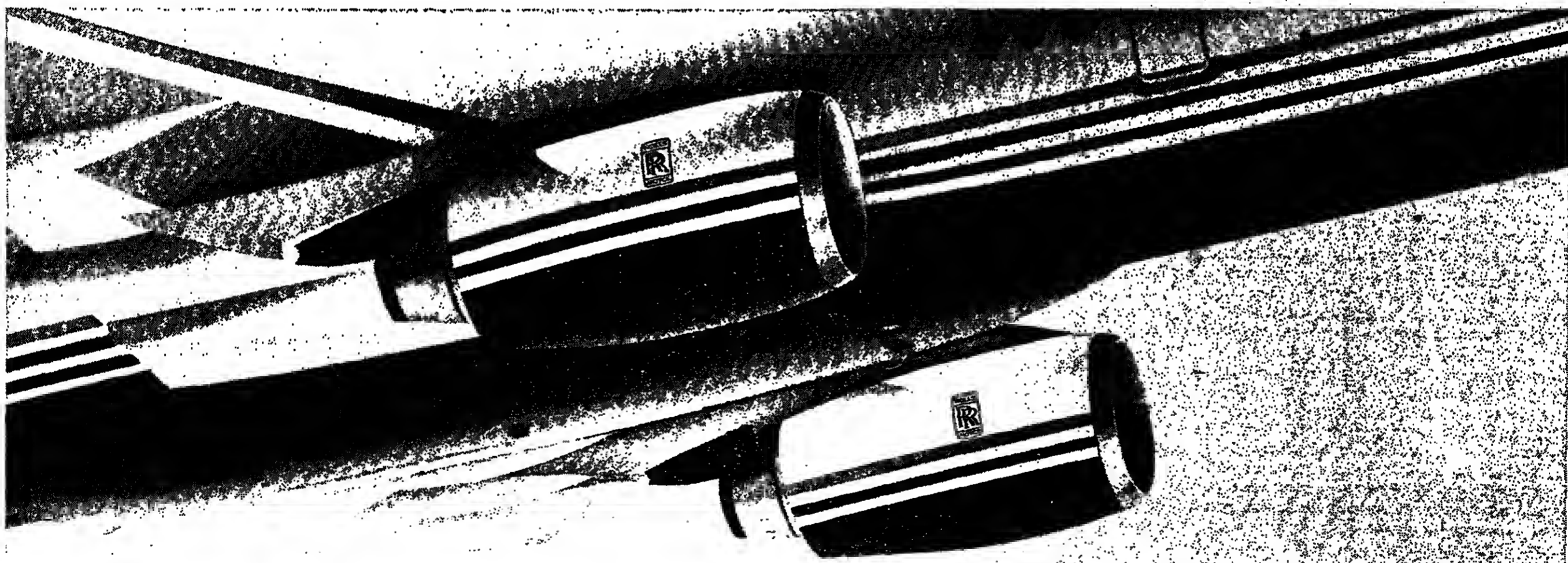
This steadily-emerging militarisation of space was given added point by President Reagan's speech earlier this spring, when he called for definition studies for a long-term "space defence programme", designed to ensure

that the Free World was not overtaken by Soviet military space developments.

Although President Reagan's speech was criticised by some, it was widely accepted in the defence industries as indicating a proper awareness of the vast potential of space as a future battleground, with a determination to ensure that the U.S., on behalf of itself and its allies, did not get left behind. The U.S. is determined "not to surrender the high ground of space" to the Soviet Union.

Subsequent to the President's speech, it is expected that available funds for military research, development and exploitation of space will expand. Spending on anti-satellite space laser systems, for example, is expected to rise to over \$500m annually by 1987-88, while the USAF's space surveillance research will rise to over \$100m a year by 1985-86.

M. D.



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